

AGRICULTURAL CHEMICALS

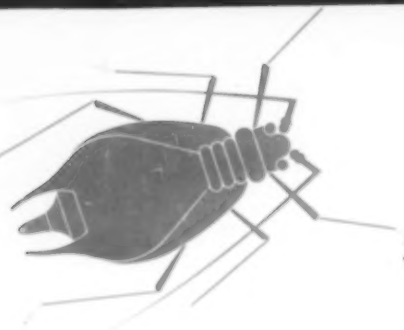


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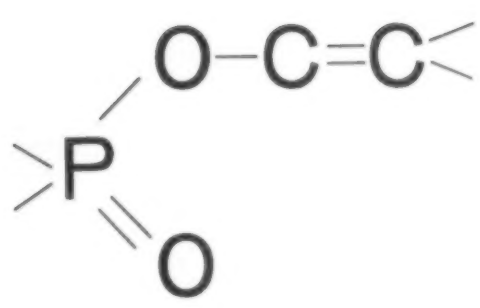
6th Annual NPFI Meeting
Resistance To Pesticides
Fertilizer Standardization Survey
Pacific Branch, ESA Meets
Beal Enters Pesticide Market
Occupational Diseases
"Slinger" Of Suspensions
Silvicides In Forestry
Ralston Dealer Program

CUSTOM APPLICATOR SECTION

July 1961



From CIBA research:
a vinylphosphate with
outstanding properties as
a systemic insecticide



Dimecron[®]

on the base of phosphamidon

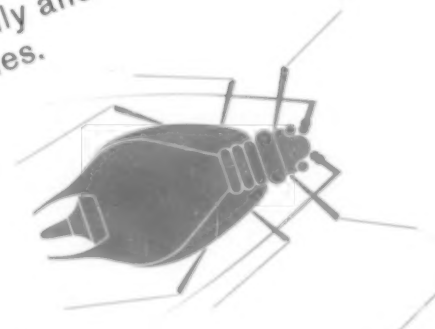


Dimecron has a very large field
of application on world's most
important crops.

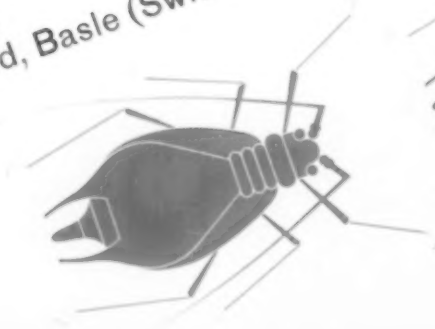
Dimecron checks sucking, chewing and
mining stages of various insects
and mites.

Dimecron degrades quite rapidly and
leaves no toxic residues.

Dimecron is odourless.



Free literature and
further information
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C I B A

BUTONATE

LOW *in toxicity*

FATAL TO BUGS

The insecticidal qualities of butonate® mean sure death to flies, gnats, mosquitoes, roaches, silverfish. This unique pesticide, developed by the Wisconsin Alumni Research Foundation, has the power to paralyze the nervous systems of insects by inactivating an essential enzyme. At the same time, it is one of the safest insecticides known so far as human beings and their pets are concerned.

The demand for butonate has brought about savings through mass production, making it

economical as well as effective, safe and convenient for consumers. Convenient because it is non-staining, inoffensive in odor, approved for use in aerosol, space and direct sprays.

Butonate is compatible with most nonalkaline insecticides and fungicides. It can be formulated with most of the commonly used organic solvents... as an oil spray, emulsion, wettable powder or dust for household use. Other promising applications are being investigated—including the control of insects affecting livestock.

Formulating and labeling information on butonate and samples are available from Prentiss. To improve *your* insecticides, get in touch today!

*Butonate's manufacture is licensed by the Wisconsin Alumni Research Foundation under U.S. Patent, Nos. 2927881, 2911435.



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AGRICULTURAL CHEMICALS



This Month's Cover

One of the largest fertilizer manufacturers on the west coast, Best Fertilizers of Lathrop, California, has moved to expand its operations by entering the pesticide market. Our cover shows Best's main plant at Lathrop. Story on page 27.

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Vol. 16, No. 7

July, 1961

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JULY, 1961

Why do fertilizer packers use more I&C multiwall bagging equipment than any other make?

Over 1000 Union-Camp I&C installations have been made in the last six years.
Here are 8 reasons behind their astonishing popularity.

1. Reduced Packaging Costs. I&C's pay for themselves. Their fast, *automatic* operation reduces packaging and labor costs, increases profitability. Dozens of repeat orders attest to their efficiency and economy.

2. 20-a-Minute—and More. The Union-Camp I&C Bagger was the first machine to introduce high-speed filling of open-mouth multiwall bags. Speeds well in excess of 20 bags per minute can be sustained, depending on the flow of the product.

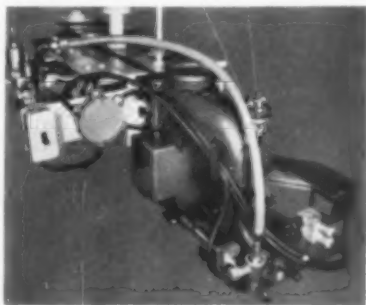


I&C V-Type Sewing Conveyor. Fixed chain brackets eliminate need for rollers. This means no freeze-ups, fewer breakdowns.

3. Outstanding Flexibility. With the versatile I&C, you can make weight changes from 25 to 200 lbs.—with just a turn of a scale dial knob! No bag clamp is necessary.

4. Accurate. The I&C *automatically* pre-weighs the net amount of material before it is dumped in the bag. At

speeds of 20 bags a minute and more, weight variation is within *plus or minus 2 ounces* on 100 lb. packages of uniform granular or pelletized products.



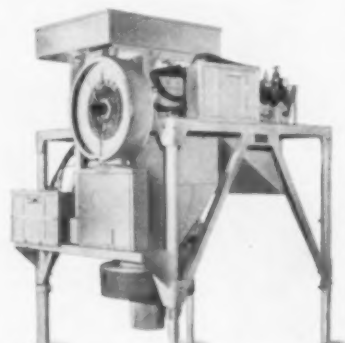
The I&C Acto-Cutter automatically starts and stops sewing action and cuts threads between bags. An outstanding time and labor saver.

5. Low Maintenance. Simplicity of design is a major feature of I&C equipment. Another is sturdy construction. Many packers report low maintenance cost a key factor in their selection and repurchase of I&C bagging equipment.

6. Cuts Production Time—Speeds Service. With the I&C you can bag and ship required tonnages faster. There is usually little or no downtime. Thus you speed customer service and delivery, reduce costly overtime.

7. Labor-Saving Accessories. There is a wide range of machine models plus many cost-cutting auxiliaries. These include sewing machine lubrication systems, dual head sewing stand, automatic actuators and thread chain cutters—everything you need to streamline your multiwall bagging operation.

8. Valuable Survey Service. Union-Camp package machinery specialists make comprehensive surveys of your plant. They make up exact machinery and installation specifications and layouts. They train operating personnel, help determine the actual savings for your operation. All at no cost or obligation.



Newest I&C Bagger—the UB-101. Machine's features include dial scale which provides for instantaneous weight changeovers from 25 to 200 lbs. with a turn of a knob.

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PACKAGE ENGINEERING

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AGRICULTURAL CHEMICALS

SALES BUILDER:

Now your customers can control destructive late-season insects up to 24 hours from harvest with Phosdrin® Insecticide without creating residue problems.

Phosdrin is the remarkable new phosphate insecticide that gives your customers fast knockdown and kill of the toughest insects—then disappears without leaving any residue.

Here is how Phosdrin works. And how Shell is getting the story to your customers.

ALATE-season insect build-up can quickly make your customers' crops unsalable. If these infestations are controlled with an insecticide that leaves excess residue on the crops at harvest, they are still unsalable.

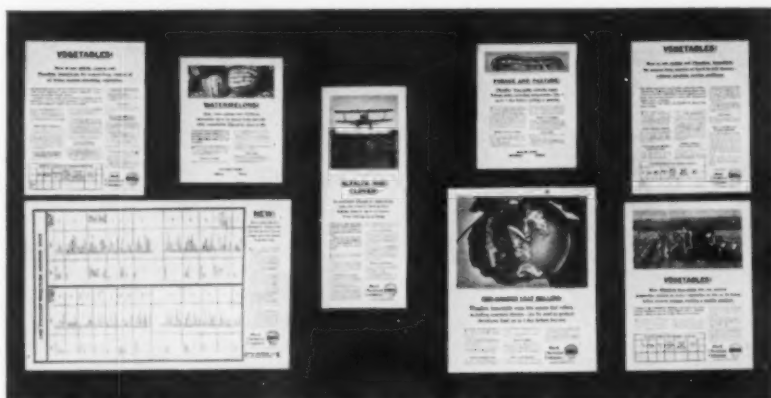
Phosdrin solves the problem

This is a problem that many growers are solving with Phosdrin Insecticide. Phosdrin kills the toughest insects fast (including strains resistant to other insecticides), usually within a few minutes of application. However, unlike most other insecticides, Phosdrin disappears rapidly after it has done its job, leaves no residue.

That is why Phosdrin can be ap-



Free—promotional material to help you sell your brand of Phosdrin.



Factual, informative ads like these are telling your customers the Phosdrin story in national, regional and local publications.

plied up to 24 hours from harvest on many crops.

Shell tells your customers the Phosdrin story

Shell is telling your customers the Phosdrin story in magazines, state farm papers, local newspapers and on radio. Some of the advertisements that have run or that are going to run are shown above.

To help you sell Phosdrin at the local level, Shell has prepared a number of leaflets for specific crops, as well as banners, newspaper mats and radio scripts.

All these materials are available from the Shell Chemical District Office nearest you. These offices can also supply you with technical information on Phosdrin and give you valuable assistance should you have a special formulating problem.

Other leading agricultural materials developed and manufactured by Shell Chemical include: aldrin, dieldrin, endrin and Vapona® (DDVP) Insecti-

cides; D-D® and Nemagon® Soil Fungicides and Allyl Alcohol Weed Seed Killer.

Here are the addresses and phone numbers of Shell Chemical's District Offices:

1220 W. Goodale Blvd. Columbus 8, Ohio HU 8-0752	2299 Vauxhall Rd. Union, New Jersey MU 6-9580
119 S. Claiborne Ave. New Orleans 12, La. 529-1561	212 S. Central Ave. Clayton 5, Mo. VO 3-0800
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100 Bush Street
San Francisco 6, California
EX 2-5400

**Shell
Chemical
Company**



Agricultural Chemicals Division

MEETING CALENDAR

July 5-6—North Central Branch, American Society of Agronomy, University of Wisconsin, Madison.

July 19-21—Fertilizer Management Seminar, International Minerals & Chemical Corp., Skokie, Ill.

July 19-21 — Southwest Fertilizer Conference and Grade Hearing, Galvez Hotel, Galveston, Texas.

Aug. 7-9—Symposium on Pesticide Residues, 18th International Congress of Pure and Applied Chemistry, Montreal, Canada.

Aug. 16-20—Canadian Fertilizer Association convention, Manoir Richelieu, Murray Bay, Quebec.

Aug. 27-Sept. 1 — Annual Joint Meeting of Biological Societies, Purdue University, Lafayette, Ind.

Sep. 3-8 — 140th National Meeting, American Chemical Society, and National Chemical Exposition, Chicago.

Sept. 16-20—Canadian Agricultural Chemicals Assn., 9th Annual Meeting, Mont Tremblant Lodge, Mont Tremblant, Quebec.

Oct. 2-6—National Hardware Show, McCormick Place, Chicago.

Oct. 9-10 — Four-State Applicators & Chemical Conference, Chinook Motel and Tower, Yakima, Wash.

Oct. 9-11—Western Agricultural Chemicals Association, Annual Meeting, Hotel Claremont, Berkeley, Calif.

Oct. 16-18 — Entomological Society of Canada, Entomological Society of Quebec, Joint Meeting, Quebec, P.Q., Canada.

Oct. 16-20—Fertilizer Sessions, National Safety Congress, Pick-Congress Hotel, Chicago.

Oct. 20-22 — Eastern Lawn, Garden, and Allied Products Trade Show, Coliseum, New York.

Oct. 29-Nov. 1 — National Agricultural Chemicals Association, 28th Annual Meeting, The Homestead, Hot Springs, Va.

Oct. 30-Nov. 1—National Fertilizer Solutions Association, Annual Convention, Edgewater Beach Hotel, Chicago.

Nov. 2-3 — Pacific Northwest Plant Food Association, annual convention, Hotel Gearhart, Gearhart, Oregon.

Nov. 6-7 — Annual Weed Conference, Washington State Weed Association, Chinook Motel and Tower, Yakima, Wash.

Nov. 7-10 — British Insecticide & Fungicide Conference, Brighton, England. Sponsored by Association of British Manufacturers of Agricultural Chemicals.

Nov. 8-10—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D. C.

Nov. 12-14 — 38th Annual Convention of California Fertilizer Association, Jack Tar Hotel, San Francisco.

Nov. 27-30—Entomological Society of America, 9th Annual Meeting, McAllister Hotel, Miami, Florida.

Dec. 5-7—National Aviation Trades Association, Annual Meeting, Washington, D. C.



**Fertilizers and
Fertilizer Raw Materials**

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& FERTILIZER CORPORATION**

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500 FIFTH AVENUE, NEW YORK 36, N. Y. • DIVISIONS: Phosphate Rock Export Corporation, Seed & Feed Corporation



New Tractor Shovel brings new economies to Swift & Co.

Michigan introduces Model 55B, early buyer likes its mobility, increased production capacity

5,400 lb lift capacity. Buckets from $\frac{1}{4}$ to 2 yds (1 yd standard). Turn radius, only 11'2". Torque converter, power shift, power steer... these perhaps are the more important specifications of the new Michigan rear-wheel-steer Model 55B. Its main benefits: excellent maneuverability plus more capacity than previously available in its price class. Sales record to date: excellent. Example: Swift & Company's Plant Food Division.

Swift, we're proud to report, in just a few months has put Model 55B's to work in company plants in Wisconsin, Iowa, Texas, Louisiana, Georgia, North and South Carolina—in most cases alongside other Michigan models! Their experience in Madison, Wisconsin, is typical...

Turns in 11'2"

Here, Swift uses their 1 yd 55B with three other Michigans. A 16 cubic foot Model 12B Michigan unloads boxcars and feeds the raw material to bin con-

veyors. Raw storage bins to mixer, the material moves in the bucket of a $1\frac{1}{4}$ yd Model 75 Michigan. Transportation from mixed product bins to two shipping mill conveyors is the job of another Model 75 and the new Model 55B.

The 55B, with its 11'2" turn radius, has been especially productive in locations where smaller bins and narrower aisles restrict maneuvering room.

300 ft cycle: 60 loads hourly

Pictures show the 66½ hp machine feeding 6-24-24 granulated fertilizer... one cubic yard, 1890 lbs per bucket load, 60 loads per hour. Average haul, 150 feet one way. All told, the four Michigans cover an area of 36,000 square feet, help make over 100 kinds of fertilizer, 95% of it bagged.

No lost time

Conditions provide a severe test of both men and machines. The air is very

dusty. Material is abrasive and extremely corrosive. During the two or three month rush season machines must work 20 hours a day... full tilt all the time... hitting the piles hard, reversing fast, driving fast. Performance? The oldest Michigan, a Model 75 bought in February 1956, has in 12,000 working hours lost virtually no assigned work time! Efficiency has been equally good for the other three Michigans, including the year-old Model 55B. "Good, rugged units," is the way Swift's Madison plant manager summarizes it. "Our Michigans sure do a lot of work for us!"

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division



2463 Pipestone Road
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In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario

More protein—more meat. High-protein grains pay big dividends in faster-growing, fatter cattle and sheep.



Pass this word on to your fertilizer customers...

NITROGEN FERTILIZATION CAN MEAN 30% HIGHER PROTEIN GRAIN... FASTER-GROWING, FATTER CATTLE AND SHEEP

Nitrogen fertilization can increase grain protein content by more than 30% . . . per-acre grain yield by more than 100%. High total crude protein in grains means more beef, lamb and mutton—on less purchased protein feed supplements. Our "Tech-Tips" Bulletin #4 gives full details . . . and Texaco offers 16 Nitrogen solutions for fertilizer manufacture.

Solutions range from 37% to 53% nitrogen content. Sixteen different Nitrogen Solutions—ranging from 37% to 53% nitrogen content—are available at our Lockport, Illinois, plant. Six solutions also contain urea. Delivery is always fast and on-time because of ample loading, switching and transportation facilities.

Technical advisory service available. Write—if you have a technical problem involving fertilizer manufacture. Our Research may have the information you need.

Our manual, "Texaco Ammonia and Nitrogen Solutions For Farm and Industry," also contains much useful information for the fertilizer manufacturer. For your free copy, plus regular copies of "Tech-Tips" as they appear, write:

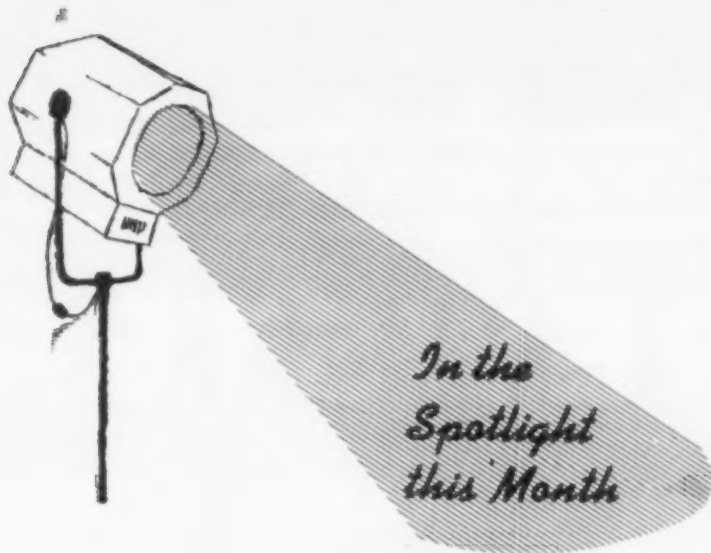
Texaco Inc., Petrochemical Sales Division, 135 East 42nd Street, New York 17, N. Y., or 332 South Michigan Avenue, Chicago 4, Ill., Dept. ACH-32.

Tune In: Texaco Huntley-Brinkley Report, Mon. Through Fri.-NBC-TV



TEXACO
PETROCHEMICALS

AQUA AMMONIA, ANHYDROUS AMMONIA, NITROGEN SOLUTIONS, DIISOBUTYLENE, ODORLESS MINERAL SPIRITS, NAPHTHENIC ACID, PROPYLENE TETRAMER AND RUST INHIBITORS, CUMENE, BENZENE, TOLUENE



- **Sixth NPFI Convention** . . . John Hall is elected chairman of the board of the National Plant Food Institute at the group's sixth annual convention. Members are told that it is imperative for fertilizer dealers to be supplied with proper agronomic knowledge so that they can make proper fertilizer recommendations to customers. Page 14.
- **Resistance** . . . The first recorded instance of resistance among pests occurred in 1908 when pernicious scale could not be controlled by the usual lime-sulfur treatments. Since that time, of course, it has become increasingly troublesome to those in the plant protection field. Resistance is defined as the developed ability of an organism to withstand some treatments that it could not previously tolerate. Page 17.
- **Standardization of Raw Materials** . . . Part II of an exclusive survey of the fertilizer industry conducted to determine the feelings of industry officials toward the question of whether there is or is not a need for standardization. Page 19.
- **Best Fertilizers** . . . One of the largest fertilizer manufacturers in the western United States has added pesticides to its line in an effort to expand its manufacturing and marketing operations. Page 27.
- **Pesticide Injury** . . . There has been a steady increase in the number of occupational disease reports attributed to pesticides in California, although the number of workers has been decreasing. Mexican nationals appear to be a special risk, probably because of inability to read and understand English. Page 30.
- **The "Ag Chem" Dealer** . . . An official of a company most successful in selling to farmers discusses the value of a strong dealer system. Also discussed are means to help the dealer build his business. Page 42.
- **Silvicides in Forestry** . . . Application technique, mixtures, and equipment have been developed for obtaining maximum control of brush and unwanted hardwoods with a minimum damage to conifers. Page 49.

International Market Report

Korea

McGraw Hydrocarbon has been repairing some parts of the Chungju Fertilizer Plant and is promoting a technical training plan in an attempt to bring daily capacity up from 250 to 270 tons of urea.

Meantime, fertilizer procurement in Korea has received a temporary delay due to the military revolution which took place in May. Currently, fertilizer procurement is undergoing drastic changes, with one major change in procurement being that the Korean government will do all the buying, whereas previously the private trade imported about 40% of the ICA financed fertilizer.

Formosa

Japan has sold 330,000 tons of ammonium sulphate to Formosa during the fertilizer year ending July 31, 1961. The price was \$40 per metric ton FOB, which was lower than in the previous year and came about because of Western European competition. Western Europe did not place any ammonium sulphate in Formosa.

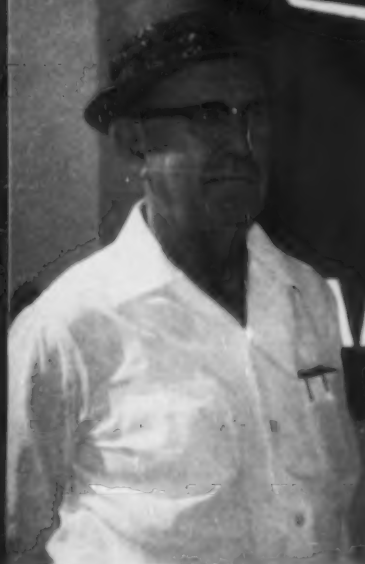
Discussions were held recently in Formosa with reference to the \$20 million Urea plant, in which the Chinese Petroleum Corp. would invest 30% while an American oil company and an American chemical company would each invest 35%. It is planned to establish the factory near natural gas deposits at Miaoli, Taiwan.

India

The new Indian calcium ammonium nitrate plant, located at the Bakhra Nangal Dam, is producing at about 50% capacity due to technical difficulties, but is presently unable to sell its output in the area for which the plant was originally intended to be the major supplier. As a result, the calcium ammonium nitrate is being shipped to the south, where a larger demand exists, which ultimately will result in limiting imports to this area.

Nevertheless, the total demand for nitrogenous fertilizers in India is approximately 2.6 million tons, expressed as ammonium sulphate, and since this entire demand is not likely to be filled either by domestic production or imports, an unsatisfied demand exists.

Compiled By International Ore &
Fertilizer Corp., New York



CYANAMID

BREWSTER

AMERICAN CYANAMID COMPANY

Arthur Crago, Manager of Phosphate Operations at Cyanamid's Brewster, Florida, Plant, draws on his more than 30 years of leadership in the phosphate industry to help meet your needs for this vital element. Among his many contributions, Mr. Crago developed the "Crago Process," the first phosphate flotation method to give you the high grade concentrates you need.

HIS BUSINESS IS MAKING YOUR BUSINESS BETTER

He's one of several hundred Cyanamid people who mine, process, research, deliver and service phosphatic materials for your acidulation and mixed fertilizer business. These people put Cyanamid's more than 40 years of phosphate experience into the kinds of products and services you can use.

Services you can use

Traffic Service: Cyanamid traffic specialists are ready to route and ship your orders without delays. Their knowledge can save you money, and can make your operation run even more efficiently.

Technical Service: Cyanamid's staff of technical experts are constantly at your service. Make your formulation and production problems theirs. That's their job.

Sales Service: Cyanamid sales representatives are available to work with you and for you in expanding present markets or in establishing new markets.

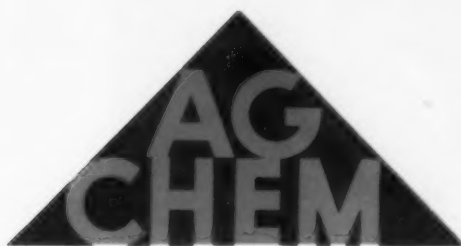
Products you can use

Cyanamid's phosphate business is the mining and manufacturing of the highest quality products for your mixed fertilizer requirements.

- Florida Natural Phosphate Rock
- TREBO-PHOS®—Triple Superphosphate
- Phosphoric acid — an economical source of P_2O_5 for high analysis fertilizers

American Cyanamid Company, Agricultural Division, New York 20, N. Y. *TREBO-PHOS is American Cyanamid Company's trademark for its triple superphosphate.





EDITORIALS

THE future of the insecticide industry may well lie in further development of systemic pesticides, in the opinion of a well-informed observer who gave *Agricultural Chemicals* his views in an interview last month. Among the factors prompting this opinion were the comparative safety to humans and ease of application of systemics.

Regardless of what may be expected from systemics, however, it certainly behooves the insecticide industry to come up with some new products which will perform more efficiently and safely than those now in use, or at least to take affirmative action to improve the performance of those pesticides, for the present products currently are facing some rather hard sledding.

DDT, for example, has just had another blast levied against it. This time by a speaker at the recent regional meeting of the American Chemical Society in Portland, Oregon. Ervin Hindin of Washington State University warned that further extensive use of products such as DDT might lead to "dangerous pollution" of streams and rivers. Warning of a possible "cumulative effect," he called for a program to check on the amount of pesticides present in water to determine the extent of pollution.

BHC, a major cotton pesticide only ten years ago, has all but passed out of the picture today because of a variety of factors, including rising costs and mounting insect resistance.

Recently, the state of California issued a report on occupational diseases in California attributed to pesticides, which points to a serious hazard from exposure of agricultural workers to phosphate-type pesticides. Because of the degree of hazard involved in the use of such pesticides, it was pointed out that "California farmers are relying increasingly on trained operators to apply their pesticides for them." And, we might add, not even all of these "trained" operators

know enough about how they should be used.

Those who manufacture highly-toxic pesticides have a big responsibility to see that they are employed safely, but far too many do not discharge this responsibility. They fail to conduct appropriate campaigns among farmers and professional applicators to make sure that these necessarily-dangerous products are used with sufficient caution. It is not enough, in our opinion, simply to insist "read the label." When it has been demonstrated over and over that misapplication still is common, a positive campaign is called for to warn applicators against the hazards involved. In the absence of such educational programs, the pesticide industry is in a poor position to defend itself in the presence of its critics.

SOME interesting opinions have been expressed with regard to standardization by buyers as well as sellers of fertilizer raw materials in response to the *Agricultural Chemicals* survey of the industry. (See page 19 for the conclusion of a two-part report on the results of this survey.) In general, users of fertilizer raw materials seem to agree that uniform terminology is most urgently needed, but many feel that the industry does not require nor warrant standardization of raw materials. Suppliers, as had been expected, maintain that it is impractical for them to be asked to deliver a "uniform" raw material.

It is heartening to hear, from many of those actually involved in fertilizer manufacturing, that they neither need nor require uniform raw materials. The spirit of competition still is too strong, apparently, to permit manufacturers to ask for standardization, which could result in higher prices for low quality materials. As one participant in the survey suggested, there still is considerable virtue in applying exceptional

(Turn to Page 70)

Future Of Agriculture Outlined By NPFJ Meeting Speakers

Correct Agronomic Knowledge Required of Fertilizer Dealers

Henry L. Ahlgren



"WHILE there are many people who are willing and anxious to help farmers develop a sound program of fertilization — to secure maximum profit per acre — it remains a fact that most farmers often depend largely on the fertilizer dealer for such assistance," Dr. Henry L. Ahlgren, associate director, Agricultural Extension Service, University of Wisconsin, told the sixth annual convention of the National Plant Food Institute held at the Greenbrier in White Sulphur Springs, W. Va., June 11 to 14.

"County agents, farm managers, university experts, bulletins, newspapers, farm magazines, and radio and television programs all exert some influence," he said, "but we cannot escape the truism that the farmer likes to talk directly to 'someone' about his own problems. This 'someone' is more likely than not the fertilizer dealer."

Dr. Ahlgren said that it is not only essential, but it is imperative that the fertilizer dealer have the correct agronomic knowledge so that he can make the proper recommendations on fertilizer usage. This he can do satisfactorily and adequately only if he is well-acquainted with the latest methods, practices, and recommendations relating to crop production, he said. "All of this," Dr. Ahlgren declared,

"points to the fact that the fertilizer dealer is a mighty individual. The hard, cold fact is that he needs to be well trained—preferably with a college degree in plant science."

He urged the fertilizer industry to exert whatever influence it can to see that such individuals are employed and, once they are employed, provided with an opportunity to attend in-service training programs aimed at keeping them up-to-date on new practices and developments. "The service I repre-

sent," he said, "will be happy to cooperate in providing training through schools, short courses, and by all appropriate means. It has the resources and the know-how to do so. It stands ready to assist. It waits only for support and encouragement from you (the industry)."

Speaking of the future of farming, Dr. Ahlgren said that, during the next 15 to 25 years, there will be an increase in the number of businesses supplying materials and services to farmers and the "frontier of the mind" as it relates to agriculture will increasingly replace the "frontier of geography." New knowledge, he explained, and its application, will be the most important "commodity" in tomorrow's agricultural world.

Management And Marketing To Become More Important

Willard M. Fifield



WITH the rapid economic growth in the U. S., agriculture during the next 25 years will become less important dollar-wise in relation to the whole economy, Willard M. Fifield, provost for agriculture, University of Florida, said at the meeting. As average incomes increase, he said, great pressure will exist for higher individual farm net income, and farmers will expand the total size of their businesses greatly to expand income.

Management and marketing will become much more important

as the size of farms increases, Dr. Fifield said. He added that farmers will specialize in one or two enterprises, not only because this is the easiest from the management standpoint, but also because it will be possible to grow the same crop on the same land year in and year out. Much of the equipment, he said, will be semi-permanent on the land, providing the necessary chemicals and pest controls to get larger yields no matter what the natural fertility of the soil.

"Even though there will be great pressure to enlarge the size of

left: Walter Sackett Sr., and Mr. and Mrs. Walter Sackett, Jr., A. J. Sackett & Sons.

right: J. F. Pisco, Standard Oil of New Jersey; Mercer Rowe, Ashcraft Wilkinson Co.; W. L. Garman, Best Fertilizers Co.; and J. A. Naftel, U. S. Borax.

left: R. Yates, Hercules Powder Co.; G. E. Garland, Texaco, Inc.; and G. L. Bridger, W. R. Grace & Co.

right: D. T. Fangmeyer, Northern Chemical Industries; C. M. Inglett, Inglett Development & Engineering Assoc.; and A. M. Horehled and M. E. Peterson, both of Sinclair.

left: T. B. Potter, NW Nitro-Chemicals; C. V. Marshall, Assoc. American Fertilizer Control Officials; and H. H. Shepard, USDA.

right: J. A. Crooks, Central Resources Corp.; W. Rohrer, Davison Chemical Co.; and L. Linton, C.R.C.

left: H. Riemes, U. S. Borax & Chemical Corp.; W. E. Shelburne, Armour Agricultural Chemical Co.; and L. D. George, Richmond Guano.

right: Mr. & Mrs. E. D. Kingsbury, Kingsbury & Co.; Angus Taylor, Chemical & Industrial Corp.; Frank Kennedy, Potash Co. of America; and Mrs. Angus Taylor.

left: M. S. Wright, Texas Farm Products; J. Prosser, Joseph L. Prosser Co.; and S. Nevins, Olin Mathieson.

right: D. H. Banks, Banks Fertilizer Co.; R. E. Bennett, Farm Fertilizers; and J. Devlin, Southwest Potash.

(See next month's issue of Agricultural Chemicals for more photos from the NPFI meeting.)



farming operations, and all farms will be larger by today's standards," he continued, "farms will tend to fall into two broad categories: (1) the very large farms with huge capital investments and automation and (2) relatively smaller farmers with highly skilled managers and much lower capital investment. The relatively smaller farms will be more efficient than the large farms, but their net income will be less. Smaller farms will use more custom work, such as spraying, fertilizing, planting, and harvesting."



Directors Elect John W. Hall, Lentz Named Vice Chairman

John W. Hall

THE board of directors of the National Plant Food Institute elected John W. Hall, president of the Potash Company of America, Denver, Colo., as chairman of the board and Elwood I. Lentz, vice president and general manager of Western Phosphates, Inc., Salt Lake City, Utah, as vice chairman of the board.

Other officers of the Institute, all of Washington, D. C., were re-elected as follows: Paul T. Truitt, president; W. R. Allstetter, vice president; Louis H. Wilson, secretary; and William S. Ritnour, treasurer.

Members of the Executive Committee elected by the Board are: J. C. Denton, president of Spencer Chemical Company, Kansas City, Mo.; James F. Doetsch, president of Chilean Nitrate Sales Corporation, New York, N. Y.; Mr. Hall; Joseph J. Lanter, president, Central Farmers Fertilizer Co., Chicago; Mr. Lentz; William E. McGuirk, Jr., president of the Davison Chemical Division of W. R. Grace & Co., Baltimore, Md.; C. T. Prindeville, vice president of Swift & Company, Chicago; E. N. Shelton, vice president of The Tennessee Corporation, New York, N. Y.; Fred J. Woods, president of The

Dr. Fifield said that fertilizer materials of the future will release their nutrients readily to plants but slowly or not at all to leaching and other forms of present nutrient loss. Most farm land, he added, will be leveled to facilitate movement of machinery. The effect of this leveling on productivity of soils will be hardly noticed, he said, because soils will be given uniform, desirable physical, chemical, and biological properties through treatment with long-lasting soil additives. Soils, he said, will be custom rebuilt.

Gulf Fertilizer Company, Tampa, Fla.; and Mr. Truitt, (ex officio). J. D. Stewart, Jr., retiring chairman of the board and president of the Federal Chemical Company, Louisville, Ky., remains on the Committee as an advisory member.

Industry Is Urged To Assist In Telling Agriculture's Story

Orville L. Freeman



SECRETARY of Agriculture Orville L. Freeman told the convention that a large part of the non-farm public pictures the farmer as "a fellow in well-cut overalls behind the wheel of a Cadillac paid for by Uncle Sam." These images, he said, are distorted, unfair, and destructive and they must be changed.

"I think your industries can help to change them," he said. "I say to you quite frankly that, in my opinion, it is good business for American industry to help get the picture of American agriculture back into proper focus."

"Let me be explicit," he continued. "Since I have been Secretary of Agriculture, I have heard a

At the business meeting on June 12, members of the Institute elected 12 new members to their board of directors for terms expiring in June 1964, as follows: Willard Ashburn, Smith-Douglass Co., Inc., Norfolk, Va.; Thomas W. Childs, Southwest Potash Corporation, New York, N. Y.; Howard J. Grady, California Chemical Company, Richmond, Calif.; Robert U. Haslanger, Escambia Chemical Corporation, New York, N. Y.; Stanley Learned, Phillips Petroleum Company, Bartlesville, Okla.; Fred L. Litty, Northern Chemical Industries, Inc., Baltimore, Md.; Edwin Pate, Dixie Guano Company, Laurinburg, N. C.; B. P. Redman, Jr., Farmers Fertilizer Company, Columbus, Ohio; Charles H. Riley, G.L.F. Soil Building Service, Ithaca, N. Y.; J. W. Rutland, Western Carolina Phosphate Company, Waynesville, N. C.; William C. Stark, Atlantic Fertilizer Corporation, Riverhead, N. Y.; Thomas M. Ware, International Minerals and Chemical Corporation, Skokie, Ill.

great deal about agri-business and the important economic relationship between the farmer and the industries that supply his agricultural needs. But I have not seen in our great mass-circulation magazines an institutional advertising campaign supported by such an industry to help get across the true story of modern agriculture and its contribution to our times.

"Nor have I turned the dial of my TV set to an industry-sponsored program about agriculture as a science or farming as a way of life," he said.

Secretary Freeman said that the government is limited in the things it can do along these lines.

(Continued on Page 72)

AGRICULTURAL CHEMICALS

Resistance:

A DISCUSSION OF ITS IMPACT ON PLANT PROTECTION

Resistance is somewhat different from the built-in tolerance of a plant or an insect towards particular chemicals, although there are no means for knowing whether originally, perhaps, the present tolerances began by being developed in response to some particular condition.

There is no way to say how long any particular resistance to a chemical will last. The speed of the succession of generations appears to have something to do with it, and also the presence or absence of the particular chemical that caused the resistance in the first place.

RESISTANCE has been defined as the developed ability of an organism to withstand some treatment that it could not previously tolerate. The first recorded instance of resistance among pests occurred in 1908 when pernicious scale in the United States could not be controlled by the usual lime sulfur treatments. This instance was followed by similar occurrences with the control of other species of scale insects by HCN fumigation between 1912 and 1925, and, in 1928, the codling moth developed a resistance to lead arsenate used as an insecticide in Colorado.

Resistance is somewhat different from the built-in tolerance of a plant or an insect towards particular chemicals, although there are no means for knowing whether originally, perhaps, the present tolerances began by being developed in response to some or other condition.

Without going into the matter in any detail, the build-up of a resistant population can be described as a selection of individuals. Most of the pests studied so far in relation to their resistance to particular poisons have been shown

to destroy these poisons inside their bodies by enzyme action.

There is no way to say with any certainty how long any particular resistance to a chemical will last. The speed of the succession of generations appears to have something to do with it, and also the presence or absence of the particular chemical that caused the resistance in the first place. If the chemical and its near relatives are removed completely from all contact with the insect over many generations, there apparently is a greater chance of the return to normal within a reasonable time. Similarly, if the insect breeds rapidly there again is a greater chance.

To take only two examples: the codling moth infesting apples and pears in South Africa's Western Cape Province gradually built up a resistance to lead arsenate before and during World War II,

until lead arsenate could no longer control the pest at an economic level, nor one which was properly safe on the trees. Many thousands of trees were pulled up before DDT was proved to be the solution to the problem in 1947, and lead arsenate now has not been in regular use for codling moth for very many years. Yet, the codling moth is believed to have retained its resistance to lead arsenate all this time and even until the present day. The codling moth normally has two or three generations in each season in Southern Africa.

On the other hand, houseflies kept in America under laboratory conditions have been shown to develop resistance to DDT or Malathion over three to four generations and to lose it again almost as quickly, provided the chemical is removed and not introduced to the succeeding generations at all. Houseflies breed comparatively quickly, as is well known.

Pest resistance usually is overcome by using another type of treatment for control. There are, however, exceptions to this, in that a resistance to one chemical often confers a similar resistance to like

This article is from a report by J. E. Winstanley, Chief Extension Officer, Plant Protection, for the Product Extension Department of the AE & CI Organization, Johannesburg, South Africa. The full report appears in the April issue of *OUTLOOK*, an African Explosives & Chemical Industries publication.

materials, and even in some cases to unlike materials. In East Africa, for instance, blue ticks are not at present resistant to DDT and they can be controlled by using either DDT or pyrethrum. On the other hand, in South Africa neither material could be used successfully in all cases, and something quite fresh has had to be tried.

Resistance To Fungicides

Fungi have exhibited no such developed resistance as pests have shown to insecticides. The original fungicides often are still being used for their original purposes and changes have been made only where even better materials (either more efficient or more economical) have been proved.

This is, perhaps, rather a surprising state of affairs in view of the ability of one "species" of fungus to exist sometimes in several different "races." This is a cause of much concern to the plant breeder who attempts to breed more disease resistant varieties of plants, but who discovers that almost as fast as he breeds a plant variety resistant to one race of a pathogenic fungus, another race comes along to render his work valueless.

Resistance to Herbicides

Apart from the inherent tolerance to particular chemicals shown by varieties or species of plants in the normal way, there is in the weedkiller field no equivalent to the developed resistance shown by insects to insecticides.

There is, however, quite another interesting phenomenon which is of practical importance, and it is more clearly seen in the case of herbicides than with the other types of crop protection chemicals. This is the change-over of a weed flora from one type to another, or as it is more scientifically called, the plant succession.

Let us say that unwanted grasses are eradicated in waste places with a particular grass-killing chemical, and this is very often the first step in Southern Africa

Resistance, in the plant protection field, usually refers to populations of individuals which have been altered in some way by outside conditions. The possibility of change was there all the time in the original population and some treatment imposed upon this population caused a selection of individuals that could, perhaps, withstand it better.

where grasses are in general more prevalent than broad-leaved plants as weeds of wasteland. As long as the weed types present are all grasses, and as long as the correct dosage is used, the grasses are killed. But, in the following months, the position changes, firstly because the effects of the chemical do not last for more than a specific time, and secondly because the extra light and air, available to a site newly-cleared of standing grasses, help the fast-growing broadleaved weeds to germinate and to develop out of all proportion, so that within some period of time the ground is covered quite as efficiently as before by vegetation, but this time composed of broad-leaved weeds. No amount of the same herbicide treatment will now eradicate the regrowth because the plants are of quite a different selection. This time a broadleaved weedkiller must be used as a follow-up treatment.

Sometimes these broadleaved weeds are even more unpleasant than the original grasses, as for instance in Natal, where a really horrible prickly species has sometimes taken over when the original and comparatively harmless grasses were killed off.

The answers to this type of trouble are either to incorporate a soil sterilant with the grasskiller at the time of the first treatment, or to treat the regrowth with different and more suitable chemicals whenever necessary. Many years of research have gone into the testing of various materials to give the best results for these. The solutions are not always as simple as they sound, however, for the more chemicals one uses to eradicate the different types of weeds, the more

expensive become the operations. Not only that, but for every chemical tried, there always are a few exceptions in the plant world which escape from any given treatment by being fairly or completely tolerant to it, and there is no doubt that where chemical control measures are being commonly used in crops and along railways, roadsides, and even on airports, the world of weeds is changing slowly all the time.

In the field of medicine the phenomenon of immunity to virus diseases may be compared with resistance in the sense that immunity also is something that can be developed. An individual may become immune either by developing antibodies, or by having them artificially introduced, but in neither case is the immunity handed down to the next generation, thus eventually changing the immunity of the whole population. At least in this respect humans cannot be referred to as "resistant pests," although there may be certain exceptions to the rule.

Resistance then, in the plant protection field, usually refers to populations of individuals which have been altered in some way by outside conditions. The possibility of change was there all the time in the original population, and some treatment imposed upon this population caused a selection of individuals that could, perhaps, withstand it better, and this, in turn, gave rise to increased numbers of their own sort in succeeding generations.

Resistant pests are here to stay, and in the world of tomorrow they doubtless will follow man to the moon and Venus as well.★★

Fertilizer Material Users Agree On Need For Uniform Terminology

Users of fertilizer raw materials agree, in general, that uniform terminology is most urgently needed, they are not in complete agreement, however, on standardization of raw materials. Suppliers, of course, point out the impracticality of a "uniform" raw material. Conclusion of a two-part report.

JOHN Mark, manager of the fertilizer manufacturing division of Farm Bureau Cooperative Association, Columbus, Ohio, raises several questions for the fertilizer "user", in commenting on the subject of standardization. For one, he points out that two entirely different types of raw material might be desirable, depending on whether the "user" is a blender or a manufacturer of granulated fertilizer, — thus a "uniform" product could hardly suit the requirements of these two different groups.

Mr. Mark's complete observations, and questions for suppliers and fellow users are as follows:

"I believe that it is a good step that the industry is taking toward arriving at a better understanding of the problems of the 'supplier' and the 'user.' It is hoped that as a result of these discussions, we can end some of the confusion that exists regarding raw materials. We need to find ways and means of using the raw materials that we buy at full value for what we paid for them. This is because the cost of materials and freight is going up every day and so called shrinkage losses are be-

coming a very important factor in the cost control of our manufacturing operations.

Will User Pay For Uniformity?

"I believe the demand for uniformity in certain areas of raw materials is brought about by two factors. One, the trend to blending. Blenders, in order to market a uniform product to the customers must have a similar product from all suppliers. Two, the manufacturers of granulated or pelleted fertilizers are demanding certain uniformity in analysis and screen fractions in order to manufacture a better product for their customers. It seems to me at the moment, that perhaps what the blenders want and what manufacturers of pelleted fertilizers want could be two entirely different types of products as far as screen fractions are concerned. Somehow these differences must be reconciled, because I don't believe the 'user' is prepared to pay the higher price that he would have to pay for raw materials, made to blenders or manufacturers specifications.

"There are, however, several areas which could be improved,

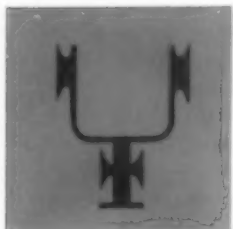
without too much trouble on the part of the producer of raw materials:

1. We should have a standard method of identification of the product regardless of the supplier. The supplier should, on the other hand, have the right to have a trade name for his product.
2. The supplier should in his own plant, be able to produce a uniform product in analysis, moisture content, screen fractions and so forth.
3. I agree that we should have a standard system of screen ranges and definitions which would be applicable to all suppliers.
4. The suppliers need to provide more rapid and accurate analysis information for 'users.'
5. Steps should be taken to reduce the percentage of fines in raw materials.

What About Uniformity in Finished Fertilizer

"I would now like to raise a question for the 'users' to ponder. We have asked the suppliers to provide us with uniform raw materials. We want this type of material to enable us either to blend satisfactorily or to granulate successfully. We also want uniform materials to enable us to maintain better analysis control over our product. It appears to me, however, that we as users can do something to provide a more uniform and better quality product for our customers. I speak especially about those of us who are producing granulated fertilizers. We call our fertilizer either granulated, pelletized, granular, semi-granular, and

SYMBOLS OF PLANT LIFE



*

In medieval times, the "black art" of alchemy was condemned by superstitious authorities hardly less ignorant of chemistry than the masses. To avoid persecution . . . and possible execution . . . for witchcraft, alchemists invented secret symbols for use in their experiments with potash and other basic elements.

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by a host of other names to convey to the customer that he is buying a product other than the old pulverized fertilizer. I think we can agree that when we look at some of the fertilizer offered to the customers, we have to exercise a great deal of imagination to call some of it granular. On the other hand, many producers are marketing a fine product which truly falls in the realm of a granular fertilizer. What I am saying, is that if we are going to insist that the suppliers provide us with a uniform product, then it is time for us to look into our own operations and market a fertilizer fully acceptable to the cus-

tomers, uniform in screen fractions, moisture and so forth.

"I am in general agreement with the words in the *Ag Chem* Editorial*. I believe in some areas that there is room for mutual agreement and common understanding. I would not, however, stand for a minute any attempt to force material suppliers to some uniform standard of production of raw materials. It is only through the individual initiative and research of the various companies who provide us with raw materials, that we are being constantly offered better materials at the same or at a lower price."

Late Analysis, Particle Size Differential, Cited as Major Headaches for "Users"

ANOTHER fertilizer user, Archie T. Edwards, manager, Southern Farm Supply, Sulphur Springs, Texas, points out the handicaps burdening the fertilizer manufacturer, and making desirable some change in current supply of fertilizer raw materials. He says:

"Uniformity and standardization of raw materials leave much to be desired, both in particle size and plant food content, speaking from a small plant standpoint. Small plant facilities, as a general rule, will not economically permit the advantage of a chemical laboratory. So we must rely on an independent laboratory with a two or three day delay to secure information on plant food content and other pertinent information necessary to do a good job in our manufacturing facility.

"All raw material suppliers are commendably prompt with this service, and we certainly can not quarrel with the accuracy of their reports. However, the reports frequently arrive in the following mail if supplies are received by truck, which either nullifies the report, slows down operations or puts us in the usual 'we will guess at it' slot. If supplies are received by rail and put in the bin, which is our method of handling raw ma-

terials, we must strike an average or do an excellent job of guessing, particularly if supplies have been received from two or more different sources, resulting in from 2 to 5 per cent differentials in plant food content, to say nothing of the difference in particle size. We are

Control of Shrinkage and Overformulation Would Show Up in the Profit Column

ROBERT Sachteschele, plant manager, Northwest Cooperative Mills, St. Paul, Minn., offers the following statement on the position of the "user":

"There is an ever growing list of materials and processes being used in the fertilizer industry. All have their place in agriculture and commerce. Certain segments of the industry, which produce an otherwise highly useful product are being forced into a squeeze between the control officials and economics. This is largely due to lack of uniformity of basic materials in regard to analysis, size and shape of particles.

"In order to comply with labeling laws of the States, over-

aware that particle size has a great deal to do with the end product, particularly where processing involves ammoniation and granulation of mixed grades of fertilizers. However, we believe the lack of uniformity in plant food content within and between suppliers causes us as many or more problems, particularly with today's pricing systems. Under this system, it is imperative that we save the 'squeal', to use 'packing house' nomenclature.

"Any materials or compounds sold on the market as a consumer item must be guaranteed to have a minimum plant food content under most state laws, with no compensation for overages. Careful analysis of state sample reports indicates that most suppliers are capable of holding their respective materials or compounds to a rather close tolerance. We are unable to see therefore, why the small manufacturers should be penalized for the apparent lack of control in plant food content, when it is obvious that it is being controlled in other marketing channels."

formulation is necessary. Yet variations in finished products are astronomical. The purchasers of basic materials are placed in an unfavorable light before the general market. Basic suppliers face no restrictions, except those self imposed. The sights could be raised and unified for the benefit of the entire industry and the ultimate consumer.

"In line with the requirements imposed on the formulator, — the basic supplier should price his product on a minimum analysis, with overages allowed to the buyer, — gratis. The formulator should be able to purchase materials according to particle size, with a realistic price differential between the popular size and the less desirable, — if cost of production is a factor.

(Continued on Page 70)

*Reference here is to the editorial appearing in the April, 1961 issue of *Agricultural Chemicals*.



'Slinger of Suspensions'

Seed-Corn Producer

Develops Suspensions Applicator

With what they believe to be an answer to the old problem of efficiently applying suspension fertilizers, an Indiana seed-corn producer has entered the liquid fertilizer application market.

EDW. J. Funk & Sons, Kentland, Indiana, producers of "Super Crost" seed corn, have entered the liquid fertilizer application market with a new method for spreading suspension fertilizers. The company is setting up a separate fertilizer corporation for the further de-


velopment and spreading of suspension fertilizers.

Key to the application of heavy low-cost slurries is a new machine developed by Funk and called "The Slinger of Suspensions." The word "slinger" refers to the machine's action in slinging (not spraying) the heavy slurry suspensions. "Slingers," says Mr. Funk, which look like inverted lawn sprayers, can be adjusted to spread almost any desired rate and quantity of fertilizer per acre. The Funk applying machine is equipped with three slingers and covers the

equivalent of ten corn rows during each trip across a field.

William F. Funk, development and promotion manager for Edw. J. Funk & Sons, reports that there are many advantages to the use of suspension fertilizers. Higher analyses, he says, can be obtained in suspensions than have been available in solution fertilizers. Suspensions can be applied in any season. When applied in the fall, winter, or spring, solutions are spread by the slinger and then are plowed under. Summer applications are "knifed" into the ground so that

How to boost your profits on alfalfa fertilizers...

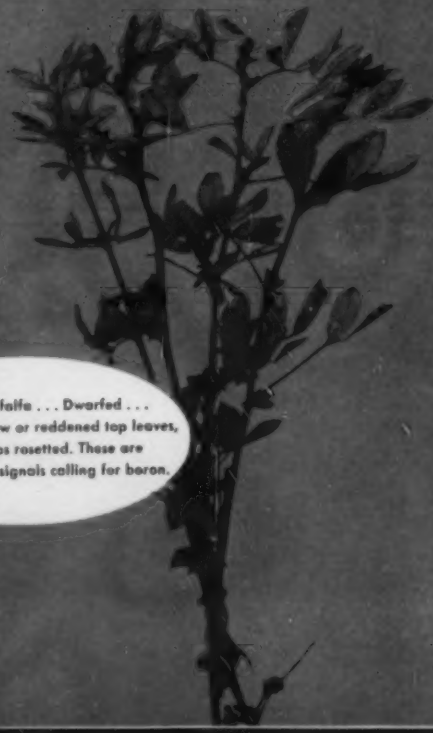


Offer an "alfalfa special"—a little borax added to your mix is all it takes to provide you with a product that has a lot of sales plus. Borax is so vital to the profitable growth of alfalfa that most large producing states recommend annual applications.

Formulate a borated fertilizer to fit your area's soil needs... it can boost yields for the farmer and build bigger profits for you.

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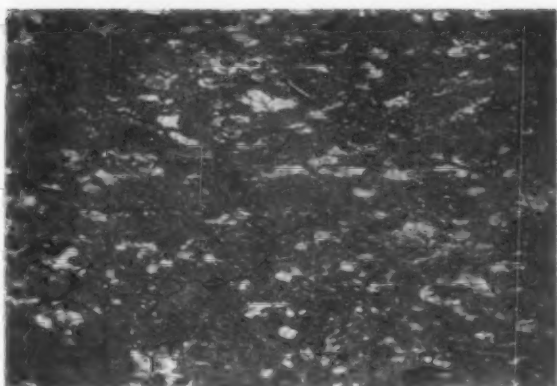
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The pattern of the solution fertilizer put down by the Slinger shows up clearly in this photo of an application of 19-8-12 fertilizer. The customer actually can see his fertilizer on the field.

the plant food can be placed after the corn is planted.

Suspensions can be applied as a complete fertilizer, incorporating all of the plant nutrients. They also can be used in conjunction with starter fertilizer programs, Mr. Funk says.

Mr. Funk describes suspension fertilizers as slurries in which fertilizer nutrients are suspended by use of a suspending agent (an Attapulgate clay) which causes the plant nutrient particles to bond to the suspending agent and remain in a heavy "solution." Suspensions can be made to fit any crop requirement, with nutrient content up to 40 units of plant food.

As with all liquids, suspensions are easy to handle since they can be pumped readily from plant to truck, from truck to applicator, and from applicator to field. In addition, insecticides, such as Heptachlor or Aldrin, can be mixed easily with fertilizer suspensions for fall and winter applications.

Edward J. Funk & Sons have engineered and built a modern liquid fertilizer plant to sequester wet-process acid with super phosphoric acid. The wet-process acid is combined with anhydrous ammonia and potash is added to make a complete fertilizer. Supplemental nitrogen solutions are added to bring nitrogen content up to specific values, if needed.

Mr. Funk reports that this continuous plant can produce analyses such as 6-18-6 at the rate of 40 tons per hour. The manufacture of this suspension fertilizer, he says, is a very simple process. The

attapulgate clay first is dispersed with a shear pump into a pre-gel, then the other ingredients are added. The secret, Mr. Funk says, is to have a mixing device in the spreader truck.

In making a complete suspension fertilizer, anhydrous ammonia is used in a one to three ratio with the phosphoric acid, and additional nitrogen is made up of a solution containing ammonium nitrate and urea. The urea, by the way, acts as an antifreeze in colder weather.

The heavy slurries are loaded into tank trucks to be taken directly from the plant to the farm customer. The Funk delivery trucks are equipped with a mechanical mixer which will mix the suspension fertilizer in the event that there is a delay in spreading.

On the spreader trucks, centri-

fugal pumps are utilized to pump the heavy material through the rotating spinners. The speed with which the spinners rotate governs the fineness of the spray pattern.

Last year, in its first year of operation with the suspension slinger, Edw. J. Funk & Sons covered 10,000 acres with suspension fertilizers. Next fall and winter, the company will conduct tests with applications of 8-12-20 at a rate of 300 pounds per acre on corn fields where farmers expect to plow-down legumes. Other practical applications listed by Mr. Funk are:

1. Plow-down 500 lbs. of 19-8-12 per acre to equal the amount of complete fertilizer that a hundred bushels of corn remove from the soil. (95-40-60).
2. Plow-down 300 lbs. of 5-15-20 per acre and 100 lbs. of 82% anhydrous ammonia to provide a per-acre application of 97-45-60.
3. Plow down 250 lbs. of 4-12-24, apply as a starter fertilizer 100 lbs. of 5-15-5, and plow down 100 lbs. of 82% anhydrous ammonia to provide a per-acre application of 97-45-65.

All of these applications would maintain the level of fertility of a soil that yields 100 bushels of corn per acre. The rates, of course, could be varied to conform with specific crops, yields, and soils.★★

Two additional application methods utilized by Funk, in addition to the original "Slinger" shown on page 22, are (top) knifing-in suspensions and (bottom) a truck-type Slinger. The pull-type slinger is used to knife-in suspensions. The spinners have been removed and a tool bar employing knives is attached. The truck-type slinger carries a 1,000 gallon tank.





NEW!

Foxboro pH Dynalog Recorder has an input impedance of 80,000 megohms — eliminates the need for intermediate amplification. Span is adjustable from 2-10 pH; zero, from 0-12 pH.

Foxboro eliminates the amplifier from pH recording and control

cuts the drift, cuts the cost, cuts the maintenance, too!



Foxboro pH Dynalog Controller — for use where it is desired to hold pH at a predetermined value.



Foxboro pH Dynalog Indicator — for use where complete record of pH value is not required.

THAT'S RIGHT — the intermediate amplifier is gone from Foxboro's new low-cost system for measuring pH. And gone with it is the wasted panel space, the drift, the daily standardization inherent with earlier systems.

In the new Foxboro system, the signal from the pH electrode goes direct to a high impedance Dynalog® receiver — without intermediate amplification. Signal operates a direct-reading indicator or recorder — or a controller and alarms, when desired.

The new Foxboro pH system is the simplest, most economical method of measuring pH available today. Ask your Foxboro Field Engineer to tell you about it. Or write for data sheet. The Foxboro Company, 137 Norfolk Street, Foxboro, Massachusetts.

*Reg. U.S. Pat. Off.

FOXBORO Analytical Instrumentation
REG. U.S. PAT. OFF.

Pesticides Are Included In Best's Expanding Operations

One of the west's largest fertilizer manufacturers has expanded its operations in the western pesticides market in a major way. Now selling more than 100 different formulations of insecticides, fungicides, nematocides, and herbicides, the company plans further expansion of its marketing and manufacturing operations.

By William L. Garman

Vice President
The Best Fertilizers Co.

EARLY in the spring of 1960, Best Fertilizers of Lathrop, California, one of the largest fertilizer manufacturers in the west moved to expand its operations in the western agricultural chemicals market in a major way. Now selling more than 100 different formulations of insecticides, fungicides, nematocides, herbicides and other agricultural chemicals, the company has important plans for expansion of its manufacturing and marketing operations.

At Lathrop, Best is located a few miles south of Stockton, on the main line of the Southern Pacific Railroad, well situated to serve the Central Valley and Coastal Valley areas. The company moves a large volume of agricultural products by trucks, and Lathrop is very close to a triangle formed by three major highways: U. S. Highway 50 on the west, U. S. 99 on the east and State 120 on the south.

In the heavy shipping season, 50 to 150 trucks move out of this



Hydrogen reformer furnace (center) at Best's Lathrop, Calif., plant is reflected in pond maintained for fire protection.

Behind fire wall at left is the ammonia synthesis unit. A second sulfuric acid contact plant is being built.

location daily. Overnight service is possible to almost any point in California. In addition, Best markets to the surrounding states of Nevada, Arizona and southern Oregon, and also ships to Mexico. The company will have complete formulating facilities at Lathrop for dusts, liquids, granulars and fertilizer-pesticides. In addition, it will have warehouse facilities for storage and distribution of proprietary items of other manufacturers.

Best was founded back in 1932 by Lowell W. Berry who is president and chairman of the board. The company was started in Oakland as a fertilizer mixer and distributor. Operations now extend from Baltimore to Hawaii, with manufacturing and distribution facilities in Houston, Texas; Casa Grande, Arizona; Honolulu, Hawaii; and the home plant at Lathrop, California.

Dr. W. L. Garman is vice president in charge of sales; Julian Rogers is vice president in charge of manufacturing; Floyd Hornbrook is vice president of research and development; David Sansome is vice president of administration. James Lindley is treasurer and corporation attorney; credit manager is Robert Duncan; and Walter Ross is comptroller.

The size of Best's operations at Lathrop can be appreciated by looking at a few statistics: The annual gas and electric bill for the plant is over one million dollars; a new bulk storage warehouse has been built with a capacity of over 35,000 tons of dry fertilizer; employees number 250; and as much as 1500 tons per day of dry materials are loaded in the heavy shipping season, plus another 700 tons of liquid fertilizer.

According to Dr. Garman, "Best of California manufactures



Lowell Berry, (left) president of Best Fertilizers, and William Garman, vice president, discuss Best's expansion plans. Mr. Berry founded the company in 1932 as a fertilizer mixer and distributor.

and markets independently from its associate companies — Best of Texas at Houston, Best of Arizona at Casa Grande, and Best of Hawaii at Honolulu."

In Texas, Best is managed by Mr. Russell Dellinger and is primarily in the fertilizer business, manufacturing ammonium sulfate and formulating various analyses of dry fertilizers.

In Arizona, Best is managed by Mr. Chuck Condon and here it formulates both liquid and dry pesticides. It also distributes dry fertilizers, as well as anhydrous ammonia.

In Honolulu, Hawaii, Best Chemicals & Fertilizers Co., Ltd., the newest member of the Best companies, is managed by Mr. John Clark. This company distributes agricultural and industrial chemicals, fertilizers and package goods through-out the Islands.

Best's Garden and Lawn Division, managed by Jack O'Connor, with headquarters and warehouse facilities in Oakland, is one of the major manufacturers and distributors of small package goods in Northern California. In addition to distribution in San Francisco and Bay Area cities, its other key warehouse points are Sacramento, Stockton and Fresno. Two years ago, formulation of pesticides and fertilizer-pesticide combinations was initiated for the garden and lawn market. Fertilizer-insecticide and fertilizer-fungicide combinations have been enthusiastically accepted in the California area. In addition to the dry fertilizer-insec-

ticide-pesticide formulations, Best also offers a complete line of liquid materials for spray application by the home owner.

The problem of control of soil insects, particularly nematodes, is one that, although recognized many years back, has had very little attention. About four years ago, Best set up its Nematocide Division under the direction of manager Jack Horner to promote the sale of DBCP (dibromochloropropane) and other nematocides in California. This division of the company has expanded rapidly and markets over six liquid formulations. In addition, it pioneered the use of fertilizer-nematocide mixtures.

According to Horner, "Formerly, little has been done about the control of plant parasitic nematodes until such high infestations developed that crops were almost wiped out. In recent years, however, large areas of California's soils have been treated to control nematodes, where formerly no

problem had been known to exist. This new concept provides substantial increases in production, quality and profit."

Best has pioneered the development of a number of new methods for applying some of the newer compounds, particularly di-bromochloro-propane (DBCP). This product was developed by the Hawaiian Pineapple Research Institute. Most fumigants used up until the development of DBCP were compounds that had to be applied ahead of planting, as they were not compatible with growing plants. In Hawaii, pineapple grows over a long period of time and a nematocide was needed that was not injurious to growing plants. DBCP can be applied to many crops as a side dressing. In California, it has worked out well in controlling nematodes in cotton, fruits, nuts, vines, melons and various vegetable crops, particularly on crops like carrots, celery, etc.

Agricultural chemical sales are managed by Lisle Garner who recently joined the company. Mr. Garner has nearly 15 years of experience in the West in marketing these products. Jim Hester will oversee formulations, labeling and technical sales.

Best Fertilizers' marketing is handled basically by district sales managers and their assistants who work with over 200 dealers in the state. These men are technically trained experts in agronomy or entomology. Recently a number of new men trained in entomology

(Continued on Page 76)

An indication of the wide variety of products now offered by Best Fertilizers is this collection from the more than 50 different products packaged in many different sizes for the garden and lawn market.



"Thanks
for
going
steady....."



POTASH COMPANY OF AMERICA

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"America's CHIEF Supplier of Potash"

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Canadian Sales Office:
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"

says Big Chief Kay-Two-Oh. And it's not Minnehaha he has in mind, but YOU, the loyal customers who've re-ordered Potash again for the coming season.

"Moon after moon (Indian bop talk for 'time after time'), paleface buyers prove faithful in ordering from Pee-Cee-A-Tribe. Me heap grateful." That's a long speech for the usually silent Big Chief. It's his way of saying "Thanks" for your contract, and of letting you know that he means to keep your good will by keeping Pee-Cee-A service the best this side of the Happy Hunting Grounds.

In closing the Chief says "How". Which means: if there's any way the Pee-Cee-A scout in your territory can be of service to you, send him a smoke signal and tell him "How".

When you're in Manhattan stop by the Chief's wigwam at 630 Fifth Avenue and let him make you welcome.

Phone, write, wire or telex us at:

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PCA Standard 60% Muriate of Potash
PCA Coarse 60% Muriate of Potash
PCA Granular 60% Muriate of Potash
Potassium Chloride (99.9% KCL min.)
Sulphate of Potash

Parathion Blamed For Injuries To California Pickers

During 1959, there were numerous outbreaks of parathion poisoning among crews of pickers in the orchards of the hot, dry, central California valleys. Twenty-five members of a single harvesting crew reportedly were poisoned by contact with parathion remaining on foliage.

Serious effort must be made to educate workers in the safe use of these materials.

THERE has been a steady increase in the number of occupational disease reports attributed to pesticides and other agricultural chemicals in California, although the actual number of workers in the agricultural labor force has been decreasing, according to a report on the subject prepared by the Bureau of Health Education, California State Department of Public Health, Berkeley. This increase is credited to the growth in the use of the more toxic pesticides, such as the organic phosphate esters.

During 1959, there were numerous outbreaks of parathion poisoning among crews of pickers in the orange, grapefruit, and olive orchards of the hot, dry, central California valleys. Twenty-five members of a single harvesting crew reportedly were poisoned by contact with parathion remaining on foliage.

During the year, the parathion poisoning cases reported among pickers were mild and there were no fatalities, but the laboratory studies that were done showed significantly decreased cholinesterase

activity in most of the cases. One investigator theorized that the cholinesterase activity of these workers had been significantly decreased by previous exposures to parathion remaining on foliage. These workers, many of them Mexican nationals, may have paid little or no attention to earlier symptoms until one of them required medical aid—then all may have become aware of their symptoms and sought medical aid.

Although the exact causes of these outbreaks among pickers have not been determined, two factors appear to be important—the unusually warm, dry weather, and a decrease in the number of days between spraying and picking. A study made at the time of the epidemics indicated that trouble occurred only when the following conditions occurred simultaneously: warm, still air with high relative humidity; large, closely set trees with dense foliage; and foliage covered with dust, undisturbed from time of spraying. There were no reports of parathion poisoning among pickers in the cool, damp coastal areas, although the preharvest interval also had been reduced there.

Thimet Intoxication

Thimet drew attention during March and April of 1959, the report discloses, when 25 farm la-

borers who were planting cotton in the San Joaquin Valley suddenly were taken ill. Signs and symptoms ranged from nausea, dizziness, and headaches, to blurring of vision and coma.

The men who became ill were exposed while loading and unloading bags of Thimet-treated seeds from trucks, loading the planters, piling the empty bags, and, finally, burning them. Thimet, like other organic phosphate pesticides, may enter the body directly through the skin as well as by inhalation and swallowing.

Since most of these men frequently work in intense heat, it is impractical to expect them to wear respirators and heavy protective clothing as preventive measures. The California report recommends the immediate availability of washing facilities with complete changes of clothing. Both the farmer and his employees should be educated to the need for protective measures.

Geographic Distribution

The California Department of Public Health reviewed over 20,000 reports of occupational disease in 1959. One-thousand and ninety-three were attributed to pesticides and other agricultural chemicals. The 1,093 came from 47 of California's 58 counties. Half came from only five counties—Tulare, 18 per cent; Fresno, 10 per cent; San Bernardino 9 per cent; Los Angeles, 8 per cent; and Ventura, 5 per cent. Most of the reports from the five counties came from the agricultural industry; however, only 19 of Los Angeles County's

Complimentary copies of the complete California report are available upon request, within limitations of the supply, from the Bureau of Health Education, California State Department of Public Health, 2151 Berkeley Way, Berkeley 4, California.



Because the fruit and vegetable crops were treated with
TRIANGLE BRAND COPPER SULFATE

Regular or basic copper sulfate should be mixed in insecticide-fungicide sprays and dusts to insure appetizing, attractive fruits and vegetables that consumers "reach for."

When used in fertilizers, Triangle Brand Copper Sulfate helps to enrich the soil, resulting in healthy, profitable crops.

Help your customers produce more profitable crops. Use regular or basic Triangle Brand Copper Sulfate in your fertilizer and insecticide-fungicide formulations...it will mean more money in your pocket!



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California farmers are relying increasingly on trained operators to apply their pesticides for them. There are at least two reasons for this trend. Modern agriculture requires expensive application equipment, such as aircraft, for effective and economic pest control, and, since many pesticides are hazardous, farmers prefer to have trained and properly equipped operators apply the chemicals for them.

89 reports came from agriculture, although this is a leading agricultural county. Three-quarters of the Los Angeles County reports came from other industrial divisions—manufacturing, 20 reports; government, 14; trade, 12; service 12; and construction, 10.

For the first time since the California Department of Public Health began summarizing occupational disease reports attributed to pesticides and other agricultural chemicals, the number of reports of systemic poisoning implicating these chemicals exceeded that of dermatitis. Systemic poisoning was responsible for 46 per cent of the cases, and dermatitis for 41 per cent; respiratory conditions were responsible for 6 per cent of the reports and other conditions for 8 per cent.

More than 40 per cent of the 1,093 reports implicated organic phosphate insecticides; 6 per cent, halogenated hydrocarbon pesticides; 6 per cent, herbicides; and 4 per cent, fertilizers. In 30 per cent of the reports, the reporting physicians failed to identify the chemicals, though those causing the more serious illnesses usually were identified.

While the organic phosphate pesticides represented 42 per cent of the total number of occupational disease reports attributed to pesticides and other agricultural chemicals, they constituted 82 per cent of the 499 reports of systemic poisoning.

The most frequently reported organic phosphate pesticide was parathion with 312 reports. Thimet came next with 25 reports, and then Phosdrin with 22 reports.

Nearly three-quarters of the 1,093 reports concerned workers in agriculture, most of whom were farm laborers. Agriculture, as defined in the California report, includes livestock and crop farming, and such services as cotton ginning, spraying and other horticultural and husbandry services. Spraying and pest control not connected with agricultural activities are included in the industrial division under Service.

California farmers are relying increasingly on trained operators to apply their pesticides for them. There are at least two reasons for this trend. Modern agriculture requires expensive application equipment, such as aircraft, for effective and economic pest control, and, since many pesticides are hazardous, farmers prefer to have trained and properly equipped operators apply the chemicals for them.

More than 12 million acres in California were treated with pesticides during 1959. Nearly 60 per cent of these were treated by custom applicators and the rest by farmers using mainly ground spray equipment.

Mexican Nationals

There has been some evidence to indicate that the Mexican nationals imported to help with the harvesting of crops are at greater risk than other farm workers, but it was not until 1959 that occupational disease data for Mexican nationals were classified separately from other workers in California and statistical evidence of this greater risk became available. The rate for Mexican nationals was

more than twice that of other farm workers for all occupational disease reports attributed to agricultural chemicals, and three-and-one-half times that of other farm workers for reports of illness attributed to organic phosphate pesticides. Among the reasons for this may be: lack of comprehension of English; strange environment; and limited time for adjustment to the new environment.

In 1959, Mexican nationals constituted 15 per cent of the total number of agricultural workers (except the self-employed) and they accounted for 17 per cent of the total occupational disease reports attributed to pesticides, but they made up 26 per cent of the systemic poisoning reports and only 9 per cent of the dermatitis reports. They also are at greater risk when exposed to the more hazardous materials than are other workers, the California study indicates.

Two fatalities attributed to pesticides and other agricultural chemicals were recorded in California during 1959. A warehouseman who worked on a fumigation detail died as a result of accumulating sufficient toxicity from repeated exposures to carbon tetrachloride. He consistently worked without the protective equipment made available to him by his employers.

Another warehouseman's death was attributed to methyl bromide poisoning, complicated by virus pneumonia. This man worked in a terminal which received grain by box-car, truck, and barge. As a rule, the grain already had been fumigated, but sometimes this had not taken place or had to be redone.

In conclusion, the California report emphasizes that much more needs to be learned about the factors affecting the decomposition of parathion, such as denseness of foliage, kind of leaf surface, preharvest interval, and humidity, temperature, and other weather conditions. Such questions must be answered.

(Continued on Page 78)

AN IMPORTANT ANNOUNCEMENT FROM ESCAMBIA CHEMICAL CORPORATION

The sale of all nitrogen products produced by Escambia Chemical Corporation is now being handled by our own sales force.

To provide the finest possible service and assistance to our customers, our Atlanta branch has moved into larger quarters and the staff has been greatly expanded. Additionally, Escambia sales representatives are now located throughout the marketing area.

For quality nitrogen products, service you can count on, and skilled technical assistance, call on Escambia.



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Sales Manager
Nitrogen Products



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Division Sales Manager
Montgomery, Alabama



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Fertilizer Raw Materials and
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JULY, 1961





Fertilizer Views and News



by Vincent Sauchelli

Dr. Sauchelli is a Consultant to the Agricultural Chemicals Industry.

Do Farmers Want Education Or Spoon-Feeding?

DO farmers want facts and information which enable them to make wise decisions on their own about the kind and amount of fertilizers and when and how to use them, or do they want simple recipes and panaceas? What is the function of the Extension expert from the state college or of the fertilizer manufacturer's field representative toward the farmer who seeks and needs help?

These questions are not merely academic. They are being posed by numerous, sincere persons whose job is to advise farmers concerning soil, crops and fertilizer problems. One of these is Samuel R. Aldrich, well-known soils specialist of the University of Illinois. Mr. Aldrich has serious doubts about the traditional attitude of the majority of extension service workers toward their function: he feels that their job is to teach farmers to understand the facts of soil fertility and proper fertilizer use, rather than to make recommendations which have to be repeated each year for the same situations. It seems to me the same criticism might apply to the attitude of many technical field men working for private companies. I am not referring to the salesmen of these companies.

To illustrate his viewpoint, Mr. Aldrich referred to a typical soil test report. The technical man can advise, say, on soil acidity in one of two ways: he can tell the farmer simply that the test shows an acid condition requiring two tons of limestone and it should be

applied about six months before the legume seeding. He gives no explanation as to the why's and wherefore's supporting the recommendations. Or he can explain the meaning of the pH or acidity index and its effect on soil structure, soil organisms, and the crop plant and then give him, perhaps, an alternative way of liming based on explained facts. In other words, his interpretation aims at building up the farmer's knowledge about soil fertility: it is education versus spoon-feeding.

Modern farming is becoming increasingly complex, and more and more like industry. Successful farmers get that way because they are alert to new developments in technology, mechanization and marketing. Their operations require a greater degree of precision: the fertility status of each field and the specific requirements of each crop have to be gauged precisely in order to achieve optimum yields with minimum waste. These farmers will demand from suppliers precise, technical information and not generalized recommendations.

In place of recommendations, Mr. Aldrich suggests it is preferable to make predictions. Prediction in this sense implies an understanding of soil and crop relationships by which the field man is able to show what results are

most likely to occur from alternative practices. Based on mathematical principles of plant growth, a soil test may be interpreted to predict the percentage of crop yield that is obtainable for each increment of plant food present in, or applied to, a field. Illinois soils specialists have calibrated their soil test technique by reference to long-time plot and field experiments. This knowledge enables them to estimate the percentage of possible yields to be expected under certain conditions of climate, soil moisture, and crop variety. For example, if the soil test shows 40 pounds of potash are available per acre, the farmer is told he may expect to get 40% of the maximum yield of corn on that field, or 51% of soybeans or 66% of wheat. If 130 pounds of potash are available, he may expect 85% of the maximum yield, or 99% of soybeans, or 97% of wheat or oats. This system is explained to the Illinois farmer so that he is able to understand that each fertilizer increment gives responses which follow a diminishing curve and this gives him a basis for deciding whether to apply enough plant food for 85, 90, 95 or other yield level.

The emphasis then is, as previously stated, on enlarging the understanding of the farmer regarding soil, climate, and crop relationships. Giving recommendations only does not do this. It is the difference between teaching principles and merely memorizing solutions to specific problems.

The present trend in our country is toward fewer but bigger
(Continued on Page 74)

Correction

In Dr. Sauchelli's column on this page last month, the formula for magnesium ammonium phosphate was printed incorrectly. The correct formula, of course, is $MgNH_4(PO_4)$.



Arcadian® News

Volume 6

Nitrogen Division, Allied Chemical Corporation

Number 7

CROPS NEED GROWTH SELL NITROGEN NOW

Crops in many sections of the country have suffered a severe set-back, due to cold, soggy weather. The effort to get crops planted—or in many cases the rush to get them replanted—has left many fields short of even normal fertilizer applications. And, with soils cold or waterlogged, the production of available nitrogen from organic matter has been slowed. The best answer to this problem is nitrogen side-dressing *now!*

Number One Need

This is the summer to sell nitrogen to perk up yellow-leaved, slow-growing crops that are obviously hungry. If there ever was a season when supplementary nitrogen would show up in extra crop growth and profits, this is it. You have the products, the equipment and the sales ability. Now is the time to feature the full line of ARCADIAN® Nitrogen Fertilizers, both liquid and dry. Every one of these ARCADIAN products has special advantages in a season like this. ARCADIAN NITRANA®, Golden URAN® and FERAN® Nitrogen Solutions are especially easy to apply fast on many acres per day the liquid way. ARCADIAN American Nitrate of Soda provides the readily available nitrate nitrogen that all crops need in a year like this. ARCADIAN Ammonium Nitrate and ARCADIAN A-N-L® provide quick-

acting nitrate nitrogen plus long-lasting ammonium nitrogen in America's favorite dry nitrogen fertilizers. A-N-L also supplies magnesium needed by many crops on a wide variety of soils. And ARCADIAN UREA 45, the 45% nitrogen fertilizer, provides the most concentrated, work-saving, dry nitrogen fertilizer farmers can use.

Stir Up the Soil

In a season like this, it helps to use side-dressing applicators that stir up the soil to let air and oxygen reach the roots. Crop roots need oxygen as well as plant foods and side-dressing breaks the surface crust on the soil to let air enter. This is especially true on silt and clay soils, and even on lighter soils where flood water or beating rain has sealed the soil surface.

Side-dress Many Crops

Where corn, sorghum, cotton, sugar beets and other major crops have already been side-dressed, don't forget to sell nitrogen side-dressing for the many other crops that need an extra nitrogen push. Silage corn, late sweet corn, tomatoes, cabbage and many other vegetable and row crops need nitrogen now. It gives these crops a chance to get nitrogen fertilizer, and nature will help them catch

up even in a late, slow season. Sell enough nitrogen side-dressing this summer and you can build a good reputation for providing fertilizer that makes crops *get up and grow!*

Don't Forget Grass

Top-dressing pastures and meadows is another summer practice that should pay you and your customers well. The wet spring brought on lush grass growth that used up much of the available nitrogen in the soil. Not much nitrogen has been broken down from organic matter to bring on re-growth of grass. ARCADIAN Nitrogen side-dressing not only supplies this needed nitrogen, but also takes full advantage of good soil moisture to make extra-heavy, second-cutting hay, and lush, green, protein-rich grazing through the remainder of the growing season.

Problem Brings Opportunity

If you have felt a pinch in the pocket-book through a slow May and June fertilizer season, summer sales are your best cure. Your farmer customers want to see their crops grow, but they can't be too sure of good growth and good yields. Help them now by persuading them to use ARCADIAN Nitrogen and you'll be doing the right thing at the right time.

(continued on following page)

Arcadian News for Fertilizer Manufacturers from Nitrogen Division, Allied Chemical

(continued from preceding page)

Check your supply of ARCADIAN Nitrogen Products now. Figure out which ones fit your sales area best, and make this a summer sales season to remember!

ARCADIAN Nitrogen Products

NITRANA—contains nitrate and ammonia nitrogen. Also available in NITRANA U formulation containing urea, nitrate and ammonia nitrogen. Ideal for liquid side-dressing by injection into the soil. Economical per pound of N.

Golden URAN—quick-acting and long-lasting. Contains nitrate, urea and ammonium nitrogen. A non-pressure liquid, ideal for speedy top-dressing or side-dressing—and a real money-maker.

FERAN—favorite ammonium nitrate fertilizer in easy-handling liquid form for top-dressing and side-dressing. Quick-acting and long-lasting.

AMMONIUM NITRATE—free-flowing, hard-pelleted and easy handling. America's favorite dry nitrogen fertilizer with the reliable ARCADIAN brand name.

AMERICAN NITRATE OF SODA—the proven old favorite for quick nitrate nitrogen results to bring crops along fast.

A-N-L—the free-flowing ammonium nitrate fertilizer that also supplies magnesium essential to good crop growth in many soils. Non-acid-forming, easy spreading.

UREA 45—concentrated 45% nitrogen, a real labor-saver. Dissolves readily in soil moisture or irrigation water. Spreads with the moisture to feed crops. A premium product at a practical price.



For Volume and Profit—Look to Lawn Fertilizer

You can cash in on the profitable market for lawn fertilizers next year if you prepare now to make the concentrated, easy-handling mixed fertilizers containing slow-release nitrogen that are in big demand by home-owners for lawns and gardens. This market is growing fast and quality products are taking a far bigger share of the total.

Volume is big enough now to make

the specialty fertilizer business attractive. And growth per year is tremendous. Surveys indicate that home-owners spent more than \$450 MILLION on fertilizers, insecticides and weed-killers in 1960—more than twice the amount they spent in 1955. Fertilizer takes the biggest share of the total, and lawn fertilizer makes up the major part of the outlay for fertilizer.

Pride and Performance

When you aim for the quality turf fertilizer market, you have a powerful influence working in your favor—the pride of the homeowner. Produce a quality product that makes it easier for the turf grower to get what he wants—a luxuriant, green, easier-to-care-for lawn—and you'll make real progress. Allied Chemical has the nitrogen and the know-how to help you make these practical, easy-to-use, concentrated lawn and garden fertilizers.

The day of selling an extra 80-pound bag of ordinary low-nitrogen fertilizer for the lawn is long past its peak. More profitable, high-analysis, high-nitrogen fertilizers are taking over the market. Whether you double or triple the plant food content per pound is not the only consideration. You provide the right high-nitrogen ratio for turf in your area,



Arcadian News for Fertilizer Manufacturers from Nitrogen Division, Allied Chemical

say a 3-1-1 or 2-1-1. And you provide more plant food in a small, easy-to-handle, easy-to-store package. The leaders in this field are making money. You can too, with the right product.

What Grass Needs

Turf experts and fertilizer experts agree that high-nitrogen balanced fertilizers are ideal for grass. The 3-1-1 and 2-1-1 ratios have been proved in use by thousands of lawn-owners. The less weight they have to lug home to give their lawns the required poundage of balanced plant foods, the better they like the results. Pride in a lawn, made by perspiration, is genuine. Pride in a lawn kept good with less work is far better—and much more apt to bring your dealers repeat customers.

Simple and Sure

To make these concentrated lawn fertilizers containing a big percentage of slow-release, long-lasting nitrogen, you need methylene ureas. The practical way to incorporate slow-release methylene ureas in your fertilizer is by using ARCADIAN N-dure, ARCADIAN Urea 45 and one of the ARCADIAN U-A-S Nitrogen Solutions. This is the way to make high-quality, high-analysis lawn fertilizers that are long on profit and volume potential. For a fertilizer containing a smaller percentage of methylene ureas, ARCADIAN DURANA Nitrogen Solution is the ideal ammoniating solution.

Many Advantages

- Methylene ureas feed nitrogen to grass at the rate grass needs nitrogen—



a little every day. Fertilizer can be put down easily to keep a lawn at its best.

- You can make the methylene urea nitrogen with molecules of varying types to provide this slow, steady release of nitrogen to the grass.
- Your concentrated fertilizer with most of its nitrogen from slowly-available methylene ureas has a pleasant odor!
- Your new, concentrated, safe-to-use fertilizer will feed a 4,000 square-foot lawn from one package that is a fraction the weight of the old 80-pound bag. Think of the additional sales and dollar volume per ton! Think of the reduced shipping and storage costs and reduced display space! Think of all the lawn owners—men and women—now able to walk out of the dealer store with a small package, instead of needing a salesman to load big bags into the trunk of a car.
- Your brand name is on the best lawn fertilizer made when you produce a balanced mixture containing a high per-

centage of methylene urea. Every ton makes more profits and less work. And satisfied customers will build your tonnage of this premium product.

Get Ready For Fall

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DURANA supplies all these forms of nitrogen economically in one ammoniating solution containing a total of 37% nitrogen. The chemical composition and physical properties of DURANA Nitrogen Solution are shown in the table on the following page.

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Through the proper use of DURANA in manufacturing complete fertilizer, approximately 20% of the total nitrogen from the solution is converted to water-insoluble organic nitrogen in the process of producing the fertilizer. As shipped, DURANA supplies approximately 25%

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DURANA Nitrogen Solution is produced and sold exclusively by Nitrogen Division, Allied Chemical Corporation. It is a product of Allied Chemical research—the research that continues to help you produce better fertilizers at lower cost. For information about DURANA and other ARCADIAN Nitrogen Products, contact Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

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Arcadian

NITROGEN SOLUTIONS

	CHEMICAL COMPOSITION %					PHYSICAL PROPERTIES			
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 100°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	-7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
DURANA®									
DURANA contains 8% formaldehyde.	37.0	13.3	53.4	15.9	9.4	7.2	1.235	0	36
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
Ammonium Nitrate	82.2	99.9	—	—	—	24.3	0.618	211	-108

Other ARCADIAN® Products: URAN® and FERAN® Solutions • Ammonia Liquor • N-dure® A-N-L® • Ammonium Nitrate • UREA 45 • Nitrate of Soda • Sulphate of Ammonia

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Concentrate Spraying of Insecticides Recommended for California Orchards at Pacific Coast Branch E. S. A. Meeting

CONCENTRATE spraying of insecticides is feasible in California fruit and nut orchards, reported Dr. Harold F. Madsen, associate entomologist of the University of California in addressing members of the Pacific Coast Branch of the Entomological Society of America at their annual meeting, held June 20-22 at the Miramar Hotel, Santa Barbara, California. Dr. Madsen said that he formed this opinion after observing the practice in British Columbia over a period of six months.

Madsen disclosed that he and John E. Dibble, U. C. Agricultural Extension Service entomology technician, are conducting experiments with concentrate spraying on pears in Yuba County, peaches in Sutter County, and prunes and almonds in Butte County. "Preliminary results of the tests indicate that this method of application provides coverage and control equal to that achieved by a dilute spray rig with less material per acre," he said.

Dr. Madsen reported that concentrate spraying is the accepted practice in British Columbia, where growing conditions are similar to California. "It is also the principal method of application in England, Holland, Denmark, and Germany," he said, "and is being adopted in New Zealand and Australia."

The concentrate spray machines used in British Columbia produce a finely divided, stippled deposit. "This type of deposit is adequate for insects as the insect moves about tree surfaces," Dr. Madsen said. "For diseases, however, this type of deposit is not always suitable, and in such cases, a wetting and spreading agent is added to obtain a continuous film."

Dr. Madsen noted that experience in British Columbia has shown that concentrate spraying with 60 gallons per acre gives as good control of insects as dilute spraying at 800 gallons per acre. "Spider mites, codling moth, peach twig borer, aphids, scale, and pear psylla," he said, "are among the insects which have been controlled with concentrate spraying."

The entomologist observed that the dosages of insecticides used in this method of application are approximately two-thirds those applied when using dilute spraying. "With the addition of a wetter or spreader, these dosages can be reduced to one-half as much as is employed in dilute spraying," he said.

Dr. Madsen emphasized that American, Canadian, and British scientists have reported that less injury to fruit and nut trees is caused by concentrate spraying than dilute. "Any compound that is inherently toxic to trees, however, is more likely to be injurious when applied as a concentrate," he explained. "On the other hand, some compounds which cause injury as dilute sprays can be applied as concentrates with no adverse effects."

New Pesticides Discussed

Progress reports were given on several new agricultural insecticides at the meeting. L. D. Anderson and H. Nakahihara, University of California, Riverside reviewed screening trials on corn, using dust formulations of several test materials. The insecticides were applied by hand to the silk of sweet corn, using a shaving brush. Fairly heavy rates were used. The chemicals under test included Zectran, American Cyanamid 18133, Union Carbide 10884, and Bayer products 4183, 30911 and 39007.

Zectran at the rates used was highly effective, and better than the DDT standard. The Cyanamid material was comparable to DDT, —while the other materials tested were less effective than DDT.

The compound Zectran is 4-dimethylamine-3,5-xylyl methyl carbamate, developed by Dow Chemical Company. Two reports concerning this new carbamate were presented at the ESA meeting. Doane Stewart, E. M. Evans and W. J. Arnold, of Dow, Seal Beach, California presented a paper dealing with the broad spectrum features of this new agricultural insecticide. They point out that Zectran functions as both a contact stomach toxicant,—and also translocates in plant tissues. It has an acute oral LC_{50} of 16-63 mg/k on guinea pigs, mice and dogs. It is reported to be especially effective against Lepidoptera, as demonstrated by ingestion and topical application tests on the salt marsh caterpillar. California red scale crawlers were controlled for a nine week period, and two-spotted spider mite was also controlled.

On Diptera, greenhouse tomato plants were protected from serpentine miner for 18 days, when treated with 2400 ppm of Zectran by dipping. Similar control was obtained when cotton plants were protected from cotton leaf perforator.

The systemic properties of Zectran were demonstrated by results of tests on cotton plants growing in soil treated with this new carbamate. The cotton was protected from cotton leaf perforator for five weeks.

Zectran On Ornamentals

W. J. Arnold, Dow Chemical Co., Seal Beach, Calif., discussed the use of Zectran on ornamentals. The insecticide, he said, can be formulated as a wet powder, in granulated form, as an emulsifiable spray, or in a bait formulation. It is promising on turf and garden pests, including, cutworms, lawn moths, millipedes, sowbugs, pillbugs, spiders, earwigs and ants. Ap-

plications to *Dichonra* turf controlled cutworms in two days and were effective for 4 to 6 weeks. As an area spray and bait, Zectran was effective against European brown snails and garden slugs.

Dr. Arnold reported that Zectran controls the major foliage feeding insects of ornamentals. In spraying tests on 479 species of ornamental plants sprayed in California at rates up to four times that required or recommended for control,—only five species were damaged to an extent requiring limited label warnings. The plant types included in these tests were: turf and ground covers, bedding and border plants, shrubs, conifers, trees, vines, "house" plants, cacti and succulants.

According to the Dow representative, the broad spectrum activity, lack of phytotoxicity, and ease of handling make Zectran a highly promising product for general ornamental uses.

Mite Control Investigations

J. Wilcox and A. F. Howland, USDA, Univ. of Calif., reported on tests with Kelthane and Tedion EC sprays for control of the two-spotted spider mite on strawberries. Control with Kelthane sprays was improved by the addition of one quart of heavy oil emulsion per acre. Plyac at four ounces per acre added to Kelthane or Tedion, or a mixture of the two, tended to give improved control. Tedion at one-half pound per acre plus Kelthane at .4 pound per acre was found to be better than Tedion at 1.0 or Kelthane at .8 pounds per acre.

Effects of application programs on citrus red mite and the development of resistance to acaricides were reviewed by L. R. Jeppson, Univ. of California. This entomologist reported that under field conditions, citrus red mite became resistant to demeton and Tedion, following 3 to 5 applications,—to Kelthane after 7 to 12 treatments, to Neotran as a result of 14 sprays, but remained susceptible to Aramite through 19 treatments covering a period of 8 years. Alternat-

ing acaricides, or combining acaricides with petroleum did not increase the number of applications of the acaricide which might be applied before resistance developed.

R. F. Smith, University of California succeeded C. H. York,

Shell Chemical Co., as chairman of the Pacific Branch.

The 1962 meeting of the Pacific Coast Branch will be held June 26-28 at the Villa Hotel, San Mateo, California.

Masachusetts Commission Proposes Stringent Pesticide Regulation

A SPECIAL Massachusetts Commission on Pesticides early in May submitted its report on recommendations relative to the use of pesticides within the state. The Commission consisted of: Charles H. W. Foster, chairman, Commissioner of Natural Resources; G. A. Michael, director, Division of Food and Drugs, Dept. of Public Health; William H. Drury, Mass. Conservation Council; Charles H. McNamara, Commissioner of Agriculture; John H. Lilly, head Department of Entomology and Plant Pathology; Edward Wright, chairman, State Reclamation Board; and Burton C. Parker.

In drafting the proposed legislation, the Commission indicated it was impressed by the prevalent public interest in the use of pesticides and by the national concern evidenced in the increasing complexities of materials in this field. The Commission observed that pesticidal chemicals "are unquestionably of major significance in the protection of public health . . . and in the suppression of unwanted plant and animal pests," yet they indicated they were concerned since "misuse of these materials has occasionally occurred with unfortunate consequences, and the long-term effects of the chemicals themselves and their residues on human beings, fish and wildlife is a matter now warranting serious attention."

The commission set up four task forces in the following fields to advise what steps should be taken: roadside brush, tree and insect control; shade tree and forest insect control; mosquito and green-head fly control; and agricultural control. All four task forces urged a continuing emphasis upon educational and training programs to

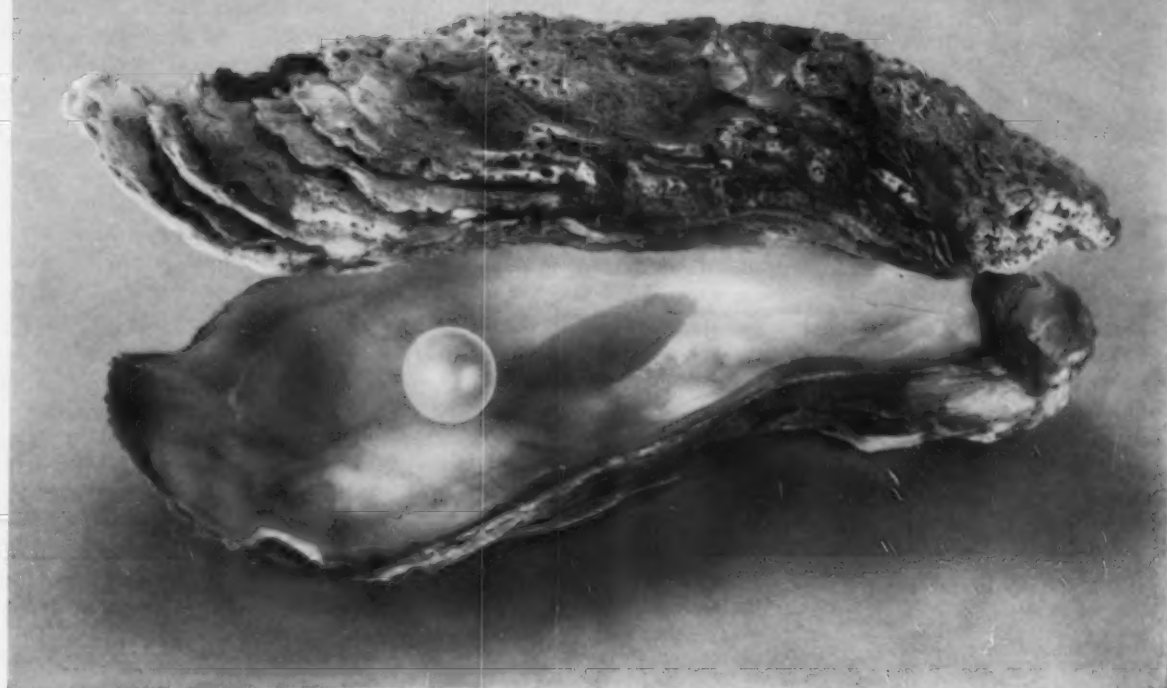
make sure that insecticides will be applied safely and effectively, and several of the groups suggested setting up an interagency central pesticide control body.

Following this study, the Commission proposed legislation (House #3151) to establish a seven man Pesticide Board which would have authority to adopt rules and regulations governing the application and use of pesticides. It is specified that the board would have the right to require persons to be licensed (\$5.00 fee) and might require permits for the application of pesticides. Violations would be punishable by a fine of \$500 or imprisonment for two months, or both.

A minority report on the proposed new bill was entered by Charles H. McNamara, Massachusetts Commissioner of Agriculture, who recommended that the bill be amended so that use of pesticides in agriculture would be exempt, except for aerial spraying operations.

The proposed legislation has been widely criticized following its introduction by many figures in agriculture and in the pesticide industry. The charge is made that the proposed legislation would allow seven politically appointed individuals, or their appointees, to do anything they want to do concerning the use of pesticides, with authority to require licensing of farmers or anyone else who applies pesticides. The bill would, it is charged, involve a complete delegation of police power by the legislature to seven department heads, giving them authority to decide what chemicals could be used and which could not, and even which branded products could be used.

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THE DEALER

Strong Independent Dealer System Spells Success for Ralston Purina Co.

Ralston Purina Co. has cast its lot with the independent dealer in areas where independent farmers predominate and has told its salesmen and dealers that the company's success must depend upon the success and growth of the dealers.

by J. E. Streetman

Ralston Purina Company

IN the years following World War II, the Ralston Purina Company pioneered in the modern version of the one-stop feed and farm supply center. The feed store was taken out of the "back alley" class and put into a clean, attractive building. Purina devoted entire two-day sales meetings to teaching its salesmen the principles of store design, salesroom layout, store traffic flow, display fixtures, and all other phases of merchandising.

As a result, the farmer for the first time was able to shop for his feed, seed, fertilizer, pesticide, farm supplies and other allied needs in a modern, attractive store which invited rather than repelled.

The Purina Company's program for the resale dealer and the independent farmers (those who still are free to make their own decisions and are not involved in the large commercial or coopera-

tive organizations) is of interest to the agricultural chemicals industry because these farmers are its best customers.

Despite the declining number of farms and agriculture workers, the man who needs the agricultural chemical industry's products is not going out of business. He is going into a bigger business. His investments are larger, his risks are greater, but this larger, more efficient farmer of today approaches his problems and studies his investments as an industrialist does. He demands of his suppliers technical competence and a clear understanding of his (the farmer's) operating problems. As the industry learns to concern itself less about his size and more about his needs, it will earn not only his respect but his business as well.

The marketing strategy of the Ralston Purina Company can best be explained with a review of the job of a Purina salesman. The company tells its salesman that his job consists of just four things:

The first is *Adequate Distribution*. This means finding and selling the right dealer for the Purina franchise in each of the 8 or 10 markets in the district as-

signed to him. This is no easy task because Ralston's standards are high. The man they are looking for must be a man with character, vision, ability, and capital. The capital needs to be determined by the potential of the market. Frequently, Purina salesmen are required to put together corporations or other combinations of local capital in order to finance a new Purina retail dealership.

The second part of a Ralston's salesman's job is *Dealer Development*. This means helping each of the dealers he serves apply proven volume and profit building principles on a sound basis. Ralston calls this Dealer Development program its Purina Archway Program. This Archway program is so called because it has a foundation, six cornerstones, and an arch across the top which holds the six cornerstones in place and makes them effective.

The foundation of the Purina Archway program is what Ralston calls *Dealer Business Management*. Over the years they have developed methods of analysis of dealer's financial statements that are tailored to the specific profit problems and opportunities of the retail feed and farm supply business, and far more searching and comprehensive than would be possible for anyone who

This article is from a talk presented by Mr. Streetman at the meeting of the National Plant Food Institute, White Sulphur Springs, W. Va., June 11 to 14.

did not understand the peculiar complexities of the fast turnover, low margin business in which farm supply dealers are engaged. They prefer to check their dealers' statements each quarter.

Dealer Business Management is a service Ralston offers free to all of its dealers. It includes the comprehensive analysis, but goes farther and offers the dealer specific recommendations for positive action to correct weaknesses brought to light by the analysis.

The credit managers at all of Ralston's 56 branch plants have been trained in this type of analysis and Ralston's salesmen themselves have a basic working knowledge of dealer business management so they will understand fully the analysis made by the credit manager. Thus they are able to translate the problems which are disclosed by the study into an action program to increase volume, reduce accounts receivable, strengthen expense control, improve margins, bring in outside capital, improve liquidity or correct whatever other point might need attention.

All of this may seem to be straying pretty far from the traditional concept of the job of a salesman. After all, nothing has been said about selling merchandise and writing up orders. And yet, this is exactly the direction Ralston's sales job has taken. The company has cast its lot with the independent dealer in areas where independent farmers predominate and has told its salesmen and dealers that the company's success must depend upon the success and growth of the dealers. Unless a dealer grows soundly and profitably, he will not long remain a dealer and Ralston's salesman will be faced once again with the difficult and time-consuming job of finding a new dealer to represent Ralston Purina in that market.

The only alternative to this approach to marketing Ralston products in these areas is an investment of hundreds of millions of dollars in company-owned retail outlets, bulk installations, trucks,

The dealer must earn his place in the chain of distribution by providing needed services, and he is entitled to reimbursement for the expense of these services, plus a reasonable profit.

Mr. Streetman is vice president and director of marketing for Ralston Purina Company.



accounts receivable, and other assets required to distribute Ralston products in over 5,000 communities across the United States. This investment the company prefers not to make.

Upon this foundation of *Dealer Business Management*, Ralston has placed six "business-building" cornerstones.

The first of these is a *Market Analysis*. With the amount of capital required, and the risk involved in the retail feed and farm supply business today, a dealer must base his business building program on something more accurate than estimates, guesses, or hunches. Most men who have lived in one market for a number of years feel that they are familiar with the buying habits of farmers and other essential market information. Yet, time and time again a complete market analysis, made by calling on not just a sample but on every farmer in that market, will reveal information which completely startles bankers, county agents, and long-time residents in all walks of life. A complete market analysis shows the potential business in the market, where the business is, and, in general, will point the way to getting it. This analysis also will provide much other valuable information, such as the advertising media which reach most farmers and how far they will travel to buy supplies.

The second cornerstone is *Organized Outside Sales and Service*. This is a recognition that in the

farm supply business today the "sack rider" has passed out of the picture. Some stores still attract a reasonable volume of "store traffic," but, to grow in the face of modern competition, a dealer must have an organized program of contacting farmers on the farm on a regular basis. The word "organized" is stressed by Ralston in this cornerstone because outside selling can be expensive and, unless it is carefully organized, it will not be productive or profitable. Ralston Purina's salesmen are trained to show a dealer how to find the right man for this job, how to organize his work, how to compensate him properly to provide a proper incentive, and how to expand outside selling to all parts of the market on a sound basis. Outside sales and service is a major sales-building force in a Ralston franchise.

The third cornerstone is *Group Selling*. For many years, Ralston has pioneered in meetings of farmers to explain feeding programs and better methods of management and sanitation which are essential to top profits. The company prepares color films, and other visual presentations as well as meeting guides to enable its salesmen and dealers, and even dealer employees, to hold these group meetings. Orders seldom are taken at these meetings, but they are followed-up promptly, however, with on-the-farm calls to every farmer in attendance to show him how the program he saw visualized in the meet-

(Continued on Page 72)

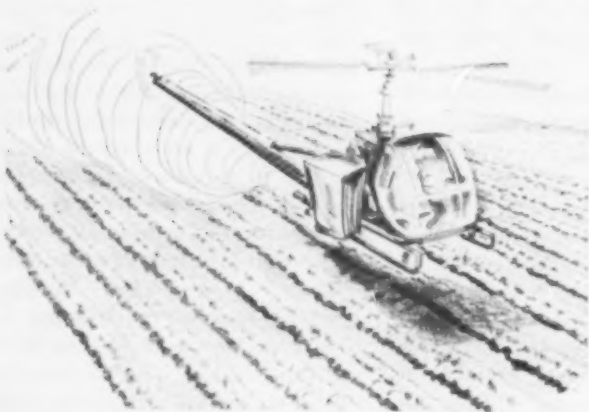
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Ded-Weed 40 — 4.0 lbs. 2,4-D Amine Salt

Ded-Weed LV-69 — 4.0 lbs. 2,4-D Low Volatile Ester

NON-CROP AREA SPRAYING:

Ded-Weed 50-50 — 2.0 lbs. 2,4-D & 2.0 lbs. 2,4,5-T, Amyl Ester

Ded-Weed T-6 — 4.0 lbs. 2,4,5-T, Amyl Ester

Ded-Weed LV-6 — 4.0 lbs. 2,4,5-T, Low Volatile Ester

Ded-Weed LV-9 — 6.0 lbs. 2,4,5-T Low Volatile Ester

Ded-Weed LV-33 — 2.0 lbs. 2,4-D & 2.0 lbs. 2,4,5-T, Low Volatile Ester



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USDA Report

Respiratory Devices For Protection Against Inhalation Of Certain Pesticides

It is important that respirators be used by persons handling pesticides during the loading of application equipment, when disposing of empty containers, and whenever they are exposed to obvious amounts of dusts or mists.

This report is based on a revised release from the Office of Administrator, Agricultural Research Service, USDA, Wash., D.C.

THE use of respirators is advised for protection from dusts or mists during field handling of, and open field exposure to, agricultural pesticides. It is especially important that respirators be used by persons handling pesticides during the loading of application equipment, when disposing of empty containers, and whenever they are exposed to obvious amounts of dusts or mists. Field operators who may be exposed to small amounts of pesticides—even those not obviously detectable—continuously during the day, or for succeeding days, should faithfully use respirators as a precaution.

Respirators will give adequate protection to airplane pilots during normal dusting or spraying operations, but gas masks should be worn when pilots are exposed to high concentrations. Pilots should take care to select and wear goggles that give a tight seal with the respirator around the nose piece.

In the use of respirators, the following practices are important:

1. Filters should be changed twice a day, or oftener should breathing become difficult.
2. Cartridges should be changed after 8 hours of actual use, or oftener if any odor of the pesticide is detected.
3. Facepiece should be washed with soap and warm water after use. It should be rinsed thoroughly, to remove all traces of soap, and dried with a clear cloth uncontaminated with pesticide. Facepiece should be placed in a well-ventilated area to dry.
4. Respirator, filters, and cartridges

should be stored in a clean, dry place—preferably in a tightly-closed paper or plastic bag.

The respirator should be fitted properly on the face, not too high on the nose, with narrow portion over the bridge of the nose, and chin cup contacting under-side of the chin. Headbands should be adjusted just tightly enough to insure a good seal. Manufacturers can supply special facepieces, if the standard one does not fit.

Respirators do *not* provide needed protection from inhalation of pesticide dust, mist, and vapors when used by:

1. Those formulating or mixing pesticides in closed or inadequately ventilated spaces.
2. Those applying pesticides, including aerosols, in greenhouses.

Full-face gas masks equipped with tested canisters should be worn under these conditions. The gas mask is worn with proper pro-

The addresses of companies supplying respirators and gas masks are given below. Respirators also are available from insecticide distributors and mail order houses.

Acme Protection Equipment Co., 1201 Kalamazoo St., South Haven, Mich.

American Optical Co., Mechanics St., Southbridge, Mass.

Bausch & Lomb Optical Co., Rochester 2, N. Y.

Chicago Eye Shield Co., 2300 Warren Blvd., Chicago, Ill.

Flexo Products, Inc., Westlake, Ohio

Hub States Chemicals & Equipment Corp., 1255 N. Windsor St., Indianapolis, Ind.

Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

Pulmosan Safety Equipment Corp., 644 Pacific St., Brooklyn 17, N. Y.

Ray-O-Vac Co., Willson Products Div., Reading, Pa.

protective clothing when applying pesticides in greenhouses or other enclosed spaces. When grain fumigants are being applied, recommendations of the fumigant manufacturer should be followed closely.

Respirators

- A. Healthguard Respirator style 95, equipped with Code B cartridge and filter 1000 or 1001. One unit attached to facepiece. (Chicago Eye Shield Company)
- B. DCA 6100 Respirator with Para-A cartridge and DC 6100-7 felt filter. (Pulmosan Safety Equipment Corporation)
- C. Agrisol Dust and Vapor Respirator, equipped with R-414 filter and 11-A cartridge. Two units attached to facepiece. (Ray-O-Vac Company, Willson Products Division)
- D. Farm Spray Respirator No. CR-72183, equipped with cartridge No. CR-49293 and filter No. 73488. (Mine Safety Appliances Company)
- E. All Vision Chemical Cartridge Respirator No. CR-74910, equipped with inner cartridge No. CR-73841 and outer cartridge No. 73927. (Mine Safety Appliances Company)
- F. Agritox Respirator, equipped with cartridge No. 11A (new type) and filter No. R490. (Ray-O-Vac Company, Willson Products Division)
- G. Respirator No. 5058, with filter-cartridge combination R-58. (American Optical Company, Safety Division)
- H. C-241 Respirator with CMP cartridge and C-241-7 filter. (Pulmosan Safety Equipment Corporation)
- I. Gasfoe Respirator No. CM-86007 equipped with cartridge No. CM-76883 and mineral wool filter No. CM-79786 (Mine Safety Appliances Company)

Gas-mask Canisters

1. Chin Style Canister No. 15 or OVAG-F Insecticide Canister (Acme Protection Equipment Company)
2. Canister GMC-1. (Mine Safety Appliances Company)
3. Canister G3FD. (Ray-O-Vac Co., Willson Products Division)
4. Universal Type canister of any manufacturer. Type N. bearing Bureau of Mines Approval.
5. Military Canister No. 10 (Army type). (Acme Protection Equipment Co.)
6. Canister No. H-3, equipped with facepiece filter holder and throwaway filter No. R361 or R393. Can be obtained with either a full-face gas mask or a half-mask facepiece. The half-mask facepiece should not be used when mixing or handling insecticides in enclosed spaces or applying aerosols in greenhouses, but is suitable for field use. (Ray-O-Vac Co., Willson Products Division)

Respirators and gas-mask canisters that will protect against dusts, mists, and low vapor concentrations of certain pesticides. Numbers and letters refer to preceding list. Plus sign (+) indicates acceptability.

Pesticides	Respirators									Gas-mask canisters					
	A	B	C	D	E	F	G	H	I	1	2	3	4	5	6
aldrin	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
calcium copper chloride				+	+	+	+	+	+	+	+	+	+	+	+
Ceresan M (N-ethylmercuri)- p-toluene sulfonamide)				+	+	+	+	+	+	+	+	+	+	+	+
chlordan	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
D-D (1,3-dichloropropene + 1,2-dichloropropane)				+	+	+	+	+	+	+	+	+	+	+	+
DDVP				+	+	+	+	+	+	+	+	+	+	+	+
Delnav (2,3-p-dioxanethiol S,S-bis(O,O-diethyl phosphorodithioate)				+	+	+	+	+	+	+	+	+	+	+	+
demeton				+	+	+	+	+	+	+	+	+	+	+	+
Diazinon (O,O-diethyl O-(2-iso- propyl-4-methyl-6-pyri- midinyl phosphorothioate)				+	+	+	+	+	+	+	+	+	+	+	+
Dibrom (emulsion) (1,2-di-bromo- 2,2-dichloroethyl dimethyl phosphate)				+	+	+	+	+	+	+	+	+	+	+	+
Methyl parathion + endrin								+	+	+	+	+	+	+	+
dicapthion				+	+	+	+	+	+	+	+	+	+	+	+
dieldrin	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
dimethoate				+	+	+	+	+	+	+	+	+	+	+	+
Di-Syston (O,O-diethyl S-2- (ethylthio)ethyl phospho- rodithioate)				+	+	+	+	+	+	+	+	+	+	+	+
endrin	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
EPN	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ethion				+	+	+	+	+	+	+	+	+	+	+	+
ethylene dibromide				+	+	+	+	+	+	+	+	+	+	+	+
ferbam				+	+	+	+	+	+	+	+	+	+	+	+
malathion	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
methyl parathion	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Methyl Trithion				+	+	+	+	+	+	+	+	+	+	+	+
Nicotine	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Panogen (cyano(methylmercuri)- guanidine)				+	+	+	+	+	+	+	+	+	+	+	+
parathion	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
phorate				+	+	+	+	+	+	+	+	+	+	+	+
Phosdrin (1-methoxycarbonyl-1- propen-2-yl dimethyl phosphate)							+	+		+		+	+	+	+
Phostex (a mixture of bis(dialkoxy- phosphinothioyl) disulfides				+	+	+	+	+	+	+	+	+	+	+	+
ronnel				+	+	+	+	+	+	+	+	+	+	+	+
schradan				+	+	+	+	+	+	+	+	+	+	+	+
Sevin (1-naphthyl methylcarbamate)				+	+	+	+	+	+	+	+	+	+	+	+
TEPP				+	+	+	+	+	+	+	+	+	+	+	+
Terrachlor (pentachloronitrobenzene)				+	+	+	+	+	+	+	+	+	+	+	+
Thiodan (6,7,8,9,10,10-hexachloro- 1,5,5a,6,9,9a-hexahydro-6,9- methano-2,4,3-benzo-dioxathiepin- 3-oxide)				+	+	+	+	+	+	+	+	+	+	+	+
Trithion (S-(p-chlorophenyl-thio)methyl O,O-diethyl phosphorodithioate)				+	+	+	+	+	+	+	+	+	+	+	+
Vapam(sodium methyl dithio-carbamate)				+	+	+	+	+	+	+	+	+	+	+	+
zineb				+	+	+	+	+	+	+	+	+	+	+	+
Mixtures of pesticides	Respirators									Gas-mask canisters					
	A	B	C	D	E	F	G	H	I	1	2	3	4	5	6
DDVP + malathion								+	+	+	+	+	+	+	+
DDVP + ronnel								+	+	+	+	+	+	+	+
Methyl parathion + endrin								+	+	+	+	+	+	+	+
Methyl parathion + DDT				+	+	+	+	+	+	+	+	+	+	+	+
toxaphene, DDT, methylparathion, + ethion				+	+	+	+	+	+	+	+	+	+	+	+



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Hercules Powder Company has kept careful records throughout the Cotton Belt for the past four years. These records, reflecting the actual use of TOXAPHENE-DDT 2:1 mix on all types of soil, under all kinds of weather and insect conditions, show that TOXAPHENE-DDT averages from 1¢ to 2¢ for each pound of lint cotton harvested. And this is early cotton, quality cotton, so much in demand!

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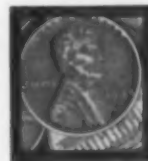
Reasons why cotton farmers rely on TOXAPHENE-DDT

1. TOXAPHENE-DDT has a long residual action... five to seven days according to official state and USDA studies.
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AGRICULTURAL CHEMICALS

Controlling Woody Plants With Minimum Damage To Pines

Among the effective applications of herbicides in forestry are the control of undesirable plant and tree species, as in the preparation of an area for planting; releasing coniferous seedlings and trees; and control of brush along power lines, trails, and roadways through forests.

The selective properties of hormone-type herbicides such as 2,4-D and 2,4,5-T are relative. Extremely heavy dosages, of course, will kill all vegetation. The damage to pines that has resulted from some mist blower applications, however, has been due primarily to spotty coverage.

ALTHOUGH the use of silvicides in forestry still is in its infancy, a number of effective applications have been demonstrated. Among these uses are the control of undesirable plant and tree species, as in the preparation of an area for planting; releasing coniferous seedlings and trees (both natural and planted) that are being crowded out by undergrowth, hardwood sprouts, or overstory; and control of brush along power lines, trails, and roadways through forests.

The conifer release jobs fall into two main types, depending upon the size of brush and other competitors. When competition is from low shrubs, herbs and other vegetation, either suppressing or threatening the development of the conifers, the job of eliminating the vegetation is called low release. Generally, the competitors are about as tall as the conifers, or a little taller.

When the competition is from tall brush and low-value hardwoods that are much larger than, and completely overtopping the conifers, the job is known as high re-

lease. Sometimes the interfering woody growth may form a double overstory or one that is two or more feet taller than the conifers. Recent developments in sprayer construction have made it possible to treat overstory and understory in the same operation.

By S. F. Potts
Entomologist
Crawford, Mississippi

Application Technique

The selective properties of hormone-type herbicides like 2,4-D and 2,4,5-T are relative. Extremely heavy dosages will kill all vegetation; when properly distributed in optimum dosages they will kill some species (like sweet-gum) and not others (such as pines). The damage to pines that has resulted from some of the mist blower applications has been due primarily to spotty coverage resulting from direct blast of the air-spray stream on the pines.

Pines most easily affected are the young seedlings planted under unfavorable soil and moisture conditions. Until well established, nat-

ural seedlings are more resistant than planted ones. In natural regeneration, also, pines may get an overdose if their crowns project one to ten feet above brush that is twenty feet or less in height, unless special precautions are taken to reduce the dosage and spotty coverage. Moreover, pines are more resistant during the latter part of the season after the new needles have hardened. Several means have been devised to effect maximum control and minimum damage. One of these is the development of two types of outlets—a single, round outlet and a three-hole outlet—and attachments for using them to best advantage. Optimum droplet size and proper application technique are other tools of value when correctly used. The chemical, dosage, formulation, and gallonage used per acre also, of course, have some effect on degree of injury.

Under these conditions, and particularly where the pines are twenty-five feet or less in height and projecting above the brush understory, three remedial procedures are important.

The possibility of spray drifting to nearby crops can be reduced by the inclusion of an appreciable proportion of relatively non-volatile liquid in the mixture, such as non-volatile motor oil and deliquescent chemicals like diethylene glycol and glycerin.

1. In order to avoid blast against the pines, the spray should be delivered with the single, round outlet over the tops of the pines and allowed to settle out on the understory below.

2. Minimum dosage should be used, usually two or three pints of 2,4,5-T ester per acre of hardwoods.

3. A machine that has been tested and selected for proper drop-let size should be used. The outlet should be pointing upwards sixty to eighty degrees from horizontal, depending upon the height of the pines. The human tendency is to set the outlets a little too low instead of too high.

It often is advisable to skip spots of well-stocked pines six to twenty-five feet tall that are above the understory.

Low Release

Either the single, round outlet or the three-hole outlet mist blowers may be used for low release work. The three-hole outlet is limited to growth of thirty feet or less in height. If pines are mixed in with the brush and undergrowth, care must be exercised to avoid any direct blast or concentration of deposit on the pines. If the brush is too low and sparse, forty-foot swaths can be covered, but if it is

high and dense, the swaths should be reduced to thirty or thirty-five feet. The three-way outlet should be pointed upwards at thirty to sixty degrees from horizontal, depending on height of growth.

High Release

If the growth is greater than twenty-five to thirty feet in height, a single, round "tree" outlet should be used. With this outlet, a mist blower can treat understory or overstory up to sixty feet in height. For high release control, the single, round outlet is pointed upward at sixty to eighty degrees from horizontal. When tree growth is tall and dense, the effective swath is reduced to about thirty-three feet. In general, the single, round outlet gives sufficient height to effect control on tall trees. This may eliminate the need for tree injections. In any event, if tree injection work is carried out, it should always follow rather than precede foliage application.

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In high release control with the single, round outlet, the swath may not be treated from two opposite sides if the trees are forty-five to sixty feet tall. If the growth is less than forty-five feet in height, it usually is advisable to treat fifty to seventy-foot swaths from two opposite sides. Often, a flagman is used, particularly if the low growth is dense.

Combination Release

In woodlands where both the overstory and the understory are treated simultaneously in one operation, the single outlet is used with the nozzle pointing in the same direction as the moving air stream rather than against it, regardless of whether or not conifers are present.

Post-foliage treatment, where young pines are not present, may consist of controlled burning and spot basal treatment or spot foliar treatment.

Droplet Size

If air velocity is too low, the spray will be too coarse for maximum deposit and, if the air velocity is too high, the atomization will be too fine, causing light deposit and excessive drift. Moreover, with very fine atomization, it is not possible to treat understory and overstory at the same time because not enough of the drops are sufficiently heavy to fall back onto the understory. Some deposit of finely atomized spray of less than fifty-microns in droplet diameter can be made on the overstory. However, such deposit is much lighter than for medium fine atomization of about ninety-microns mass average diameter. The latter would provide a good deposit on the understory as a result of "fall-out" of the larger drops.

To a limited degree, drop size can be increased or decreased by manipulation of the nozzles, if air velocity is not too great. For example, if one wants to treat the overstory alone, or understory alone, with a mist blower, he should point the nozzle against the air blast. If the idea is to treat both

When growth to be sprayed is greater than 25 feet in height, a single, round "tree" outlet should be used. For shorter growth, a three-hole outlet mist blower is available. Either blower can be mounted on a truck or pulled by a tractor (as shown).



overstory and understory simultaneously, the nozzle is pointed with the air blast.

To apply extreme limitation to drift, a nozzle should be used that will produce very large droplets. In this case, it is advisable to dilute the mixture for applications of eight to ten gallons per acre to obtain sufficient coverage with the large drops. Reducing engine speed increases droplet size, but it also reduces the swath width and the distance to which the spray can be projected.

The optimum mass average droplet diameter for 2,4,5-T-type sprays is approximately ninety microns, and seventy microns for non-hormone chemicals like ammate. For most insect control, droplet size should be fifty to sixty microns. Forty microns are recommended for disease control.

The mist blower is a very effective tool for applying herbicides and silvicides, but it must be used correctly for best results to be obtained. For most brush and forest management operations, mist blowers in the five to fourteen h.p. sizes are most applicable. With larger sizes it sometimes is difficult to control the spray.

Air Capacity

The aircapacity of a mist blower is determined primarily by the air volume that goes through the outlet. This, in turn, is directly proportional to the square area of the outlets, if air pressure is equal over the entire outlet. In general, the effective area of a square outlet is twenty to twenty-two per cent

less than for round outlets of the same square area. At equal velocity, an outlet that is six inches in diameter delivers 2.25 per cent more air than a four-inch outlet. Likewise, a square outlet six by six inches also can deliver 2.25 per cent as much air as one of four by four inches.

Mixtures

The formulations, dosage, and gallonage used have a great deal of control over effectiveness, cost, and the degree of injury to conifers. Non-phytotoxic, white paraffin oils and water in the mixtures tend to reduce foliage injury. High volumes of mixture per acre increase costs since they require more mixing, hauling, application time, and chemicals. In general, for equivalent dosages, the use of three to four gallons per acre of properly applied mixture is as effective as five to ten gallons per acre.

The possibility of spray drifting to nearby crops can be reduced by the inclusion of an appreciable proportion of relatively non-volatile liquid in the mixture, such as non-volatile motor oil and deliquescent chemicals like diethylene glycol and glycerin. The loss from the drops of volatile ingredients, such as water, solvents, kerosene, and diesel fuel, is one of the main causes of drift injury to nearby crops. As these chemicals volatilize from the droplets moving through the air, the droplets become lighter and lighter and drift farther and farther. Proper precautions, therefore, should be followed to reduce this hazard.★★

8-Row Pull-Type Sprayer



Finco, Inc., Aurora, Ill., is offering an eight-row, pull-type sprayer that is equipped with a 1,000-gallon tank and is intended primarily for use in applying liquid fertilizers. The tank is equipped with a mechanical agitator and a special access door that permits a man to climb inside the tank for cleaning purposes. The spray unit is complete with high-pressure hoses, pancake-type filter, and a high-capacity pump powered by a 6.3 horsepower gasoline engine.

NATA Ag Pilot Ratings

The National Aviation Trades Association is distributing to its applicator members the new rating cards that are to be issued to qual-

ified and responsible agricultural pilots.

The rating cards will show the kind of aircraft the pilot is competent to fly in aerial application operations, how many years experience he has had, and in what states he has worked. The purpose of the ratings, which will be issued only to persons known by an NATA member to be qualified, is to enable operators to hire people they know will be competent.

NATA's new ratings also will show what dates during the year a pilot may be available for employment and a listing of available pilots will be maintained at NATA headquarters in Washington, D. C. No charge will be made for the ratings and pilots need not be employed by NATA members to get one. The ratings, however, are obtainable only from NATA members.

Fisons Develops Low-Volume Spray Technique

FISONS Pest Control Ltd. (England) has announced the development of a new spraying technique, called the Lovo formulation principle. The technique was developed at the Chesterford Park Research Station during a study of the physical problems of low-volume spraying, and is designed to meet a particular need.

The object of the research which produced Lovo was to discover a formulation which would retard evaporation of the water used to carry the active spray ingredient, and to ensure that the spray droplets would leave an adherent and weather-resistant residue. Evaporation of water can be reduced by the presence on its surface of a very condensed monomolecular layer of certain paraffinic substances, particularly long chain saturated alcohols. Alcohols, however, are expensive and saturated fatty acids are used instead, which, although they do not have as great an effect on evaporation as alcohols at their best, are quite adequate for the purpose. They can also be supplied in a formula-

tion which makes them very much more available to the new surfaces as they are created.

The adherence characteristics are achieved by use of basic amines in the spray which keep the fatty acids in solution, but which are volatile so that, when the spray deposit has eventually evaporated, the fatty acid is left in its free state as an agglomeration of micro-crystals. These are formed on the leaf and, therefore, key-in very satisfactorily to existing paraffinic crystals which already are firmly attached to the leaf cuticle in the form of natural waxes.

At present, three formulations are available as liquids which are mixed with the water in the spray together with the finely-ground insoluble insecticide or fungicide. Two of the formulations provide strong adherence and differ in that one is prepared for use in more-temperate climates, but both are for insecticides. The third is designed for use with insoluble fungicides. Work is going on to enable more convenient combined formulations to be supplied.

Todd Fog Applicator

Todd Shipyards Corp., Brooklyn, N. Y., has prepared a booklet to describe its TIFA insecticide fog applicator. The booklet not only describes the machine and its operation, but is illustrated with photographs of actual insect control operations being carried out with the TIFA applicator. The booklet is available from the Sales & Service Departments, Columbia & Halleck Streets, Brooklyn 31.

Powerpak Portable Duster

Powerpak Equipment Co., Vista, Calif., is offering a portable duster for use on crops that can be dusted in swaths from 6 to 24 feet. The duster is powered by an Ohlsson & Rice Compact engine that weighs only 3-3/4 pounds (complete with fuel tank). The entire unit weighs 18 pounds and is equipped with shoulder straps.

Tryco Fiberglass Tanks

Tryco Manufacturing Co., Decatur, Ill., is offering a 600-gallon molded fiberglass nurse tank. Among the features claimed for the tank are light weight, little maintenance, and translucency that permits a view of the liquid level at all times.

Sprayhead Being Tested

The new airfoil sprayheads made by the Sprayfoil Corp., Bloomington, Minnesota, and involving a new spraying principle, are being evaluated for the second year at the experiment station of Texas A & M College to determine the possibility of their use with cotton sprays.

The airfoil principle features a sprayhead that will not clog or rust. The airfoil method uses low air pressure to spray an especially fine mist at high velocity but very low pressure per square inch. Results of the Texas A & M tests have not yet been reported.





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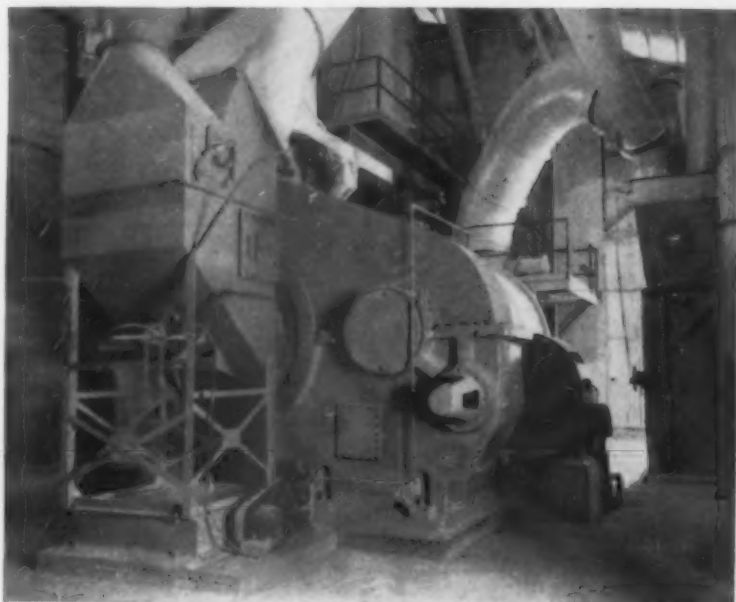
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PEST ROUNDUP



by Kelvin Dorward

Light Boll Weevil Activity Underway In Several Areas

BY the latter part of May, the boll weevil was beginning to show activity in several areas. A few punctured squares were reported from the lower Rio Grande Valley of Texas. Although populations were generally light, some improperly treated fields had from 10 to 30 percent punctured squares. Activity has been much slower this spring in central Texas than during the corresponding period in 1960. In McLennan and Falls Counties, Texas, weevils were found at the rate of 35 per acre during the week ending May 26, compared with 59 per acre during the same period of 1960.

The first weevil of the season found on seedling cotton in the Mississippi delta area was taken in Issaquena County, Mississippi, May 24. Two weevils were found in Sunflower County on May 25. No heavy movement to cotton was noted in the delta area. Populations of overwintered weevils were unusually light in cotton fields throughout Louisiana. Weevils averaging 20 per acre were found in three cotton fields in the Tallulah area.

Thrips were the outstanding cotton insect during late May. Light to medium populations were present in central and southeastern Arizona cotton. Controls were necessary in some cases, particularly in the southeastern area. Populations generally were light to medium on seedling cotton in Nevada, but some spotted, heavy damage occurred in the Pahrump Valley, Hye County. Moderate infestations were found in Dona Ana and Lea Counties, New Mexico, and some

growers were preparing to apply controls.

In Texas, thrips were causing severe damage to emerging cotton in Terry County and surrounding areas of the south plains. Populations were heavy in untreated fields of the coastal bend area and parts of McLennan and Falls Counties. Infestations were general on Louisiana cotton and continued to increase in Madison Parish. Controls were being applied by most growers. Both damage and infestations were on the increase during the last week in May in the Mississippi delta area. Most of the older cotton was not being damaged, but heavy damage was reported in some young cotton. Moderate to heavy populations were reported from Georgia.

By late May, grasshoppers were beginning to increase in several areas. Populations as high as 45 per square yard were reported on rangeland in areas of Roosevelt County, New Mexico. Other New Mexico Counties reporting counts up to 30 per square yard were Harding, Union, and Colfax. Dry weather was delaying hatch. Heavy nymphal populations were reported in many areas of Texas. If dry weather continues in the State for a few weeks, widespread damage is expected. Medium to heavy infestations of grasshoppers were noted along roadsides, in field margins, and in range and pastures in isolated areas throughout the western part of Oklahoma.

The alfalfa weevil now is established in Ohio. Although one specimen was found in Belmont County, Ohio, in 1960, subsequent

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is head—Survey & Detection Operations, Plant Pest Control Division, U. S. Department of Agriculture. His observations are based on latest reports from collaborators in U.S.D.A.'s pest surveys throughout the U. S.

surveys last year failed to find additional insects. Surveys during May of this year have shown the insect to be in 13 eastern Ohio counties, with the maximum adult population found being 10 per 100 sweeps in Monroe County. In one Noble County field, larvae injured 52 percent of the alfalfa plants. Total damage, however, was slight.

Heavy populations of the alfalfa weevil were reported from Westmoreland and Bedford Counties, Pennsylvania. Insecticides were giving only temporary control. Damage was reported also from New Jersey, Maryland, Virginia, and South Carolina.

The pea aphid was still rather active in many areas of the country by late May. During the last week of the month, heavy populations were still recorded on succulent legumes in many areas of Texas. Although populations were lower in New Mexico than for the past two months, heavy populations were still damaging alfalfa in many areas of the State. Populations in Colorado were increasing, with counts in Baca County ranging from 10 to 15 per sweep.

Counts of the pea aphid were very high on alfalfa in southeastern South Dakota. Some fields had counts of 600 per sweep, with the average being 150. The alfalfa was showing a great deal of damage. Heavy populations were recorded

(Continued on Page 76)

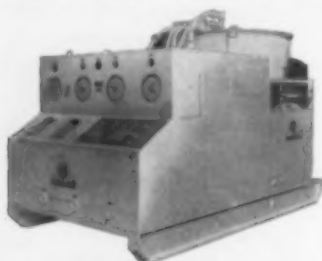
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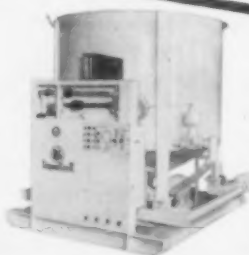


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January 31, 1961

Mr. W. R. Stephens, Manager
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Secretary and General Manager

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LISTENING POST



by Paul Miller

Effectiveness Of Fungicides For Controlling Pecan Scab

ACCORDING to George L. Barnes (1), of the Oklahoma Agricultural Experiment Station, pecan scab, caused by the fungus *Fusicladium effusum*, is troublesome throughout most of the pecan belt, especially in rainy, humid regions or seasons and its control is of great importance to the industry. Results obtained from tests with numerous fungicides have varied according to regional climate and seasonal moisture conditions.

In 1959, a severe scab season in Oklahoma, 13 protectant fungicides were tested for control of the disease in cooperative experiments of the Crops Research Division, Agricultural Research Service, United States Department of Agriculture, and the Oklahoma Agricultural Experiment Station. Zinc ethylene bisdithiocarbamate (zineb), tested in two 65% commercial formulations (Parzate, Dithane Z-78) and in a tank-mix preparation of nabam plus zinc sulfate, provided excellent control, as did 50% 2,4-dichloro-6-(*o*-chloro-anilino)-*s*-triazine (Dyrene) and 65% *n*-dodecylguanidine acetate (dodine; Cyprex), as well as low-lime Bordeaux mixture.

Two new dithiocarbamate fungicides, 42% diammonium ethylene bisdithiocarbamate (Amobam) and 41.7% ammonium dimethyldithiocarbamate (Dibam A), which Barnes had previously found to be toxic to the causal fungus in laboratory tests, gave very poor control. Zinc dimethyldithiocarbamate (ziram), used in three different formulations (Zer-

late, 76% ziram; Niacide Z, 59.8% ziram plus 5.2% zinc mercaptobenzothiazole; and a tank mixture of Dibam A and zinc sulfate), also was not effective. Nuts from trees sprayed with any of these ineffective materials were only partially filled and were unmarketable.

Bordeaux mixture provided good control, as mentioned, but it permitted aphid build-up and also caused some russetting of nut shucks. Barnes concluded that zineb still retained first place for scab control in Oklahoma. He warned that Dyrene and Cyprex, although producing results that warranted further study, could not be recommended for grower use because residue tolerances had not yet (as of December 1, 1960) been established by the Food and Drug Administration for these fungicides on pecans.

Control of Fireblight

J. W. Bushong and Dwight Powell (2), of the University of Illinois, reported that results of their preliminary experiments definitely indicated that 9-(*p*-*n*-hexyloxyphenyl)-10-methyl-acridinium chloride (phenacridane chloride; EP-166 of Morton Chemical Company) possessed a high degree of activity against the bacteria causing apple fireblight (*Erwinia amylovora*) and peach bacterial spot (*Xanthomonas pruni*). For both diseases phenacridane chloride was used at concentrations of 100, 200, and 400 parts per million (ppm) and applied as sprays. Natural twig blight infection by the apple fireblight bacterium was effectively

This department, which reviews current plant disease problems, is a regular feature of AGRICULTURAL CHEMICALS. The comments are based on observations of collaborators of the Epidemiology Investigations, Crops Protection Research Branch, USDA, Beltsville, Md.

controlled at all concentrations by seven applications. Natural infection of peach bacterial spot did not occur during the season; therefore peach leaves were artificially inoculated 3 days after the last of eight sprays with phenacridane chloride. The 100 ppm concentration allowed moderately severe bacterial spot infection but higher concentrations greatly reduced bacterial spot. No evidence of phytotoxicity was observed.


Bushong and Powell noted that on treated apple twigs symptoms of developing fireblight were delayed by 1 to 2 weeks. They concluded that in these preliminary tests the phenacridane chloride acted as a protectant rather than as an eradicant.

Control of Fusarium Patch

C. J. Gould, R. L. Goss, and V. L. Miller (3), of Washington State University, Western Washington Experiment Station, Puyallup, Washington, in 1956-1959 tested numerous materials for control of Fusarium patch (*Fusarium nivale*), which, they said, is the most troublesome disease of golf putting turf in western Washington. They found that better and faster control was obtained from treatment with organic mercurials than with inorganic mercury compounds, cadmium compounds, thiram, and several other types of fungicides. Treatment with cadmium compounds, on the other hand, usually

(Continued on Page 74)

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Washington Report



by Donald Lerch

Administration's Farm Bill Is Due For Considerable Change

ONE of the major bills not affected so far by the tense, cold war atmosphere in Congress is the Administration's omnibus farm bill. At this writing, this measure, which would set up commodity-by-commodity solutions for reducing supplies to match demand, is bottled up in the House Agriculture Committee.

Advocates for the measure claim it would take the government farther out of agriculture and give more say to the farmers. Opponents point out that provisions in the bill, as it stands, would enable government, sometime in the future, to impose more complete control over what farmers could grow, and sell, and what prices farmers could get.

In any proposed radical change in our biggest single industry, many factors become involved. The big one in this bill, say some of its advocates, is the issue of who will control agriculture in the future — farmers or the food processing and distributing firms.

The bill's opponents argue that the issue presented is whether agriculture will be controlled by the people in it — farmers, food processing and distributing companies — or by government. With such sharp lines drawn already, we can expect that any overall farm bill passed by Congress this year will be considerably changed from the version originally advanced by the Administration.

Distribution of Surpluses

While Agriculture Secretary Orville Freeman is trying to reduce

food surpluses by means of his proposed omnibus farm bill, Dr. B. R. Sen, Director-General of the Food and Agriculture Organization, is making plans for distributing more surpluses.

In a special report, Dr. Sen says that over the next five years about \$12.5 billion worth of commodities will become available for use outside of commercial channels. FAO hopes to use these surpluses to improve the diets in underdeveloped countries.

In today's hungry world food is power, and, in this field, the U.S. is unrivaled as the most powerful country the world has ever known.

NAC Expanding Services

The National Agricultural Chemicals Association is moving ahead with the times. The new organizational structure, to go into effect September 1, is designed to further expand its services to members and to the industry.

By being named President, Lea S. Hitchner re-assumes the title and the position he held when he and others founded the association in 1933. In this position he expects to have more freedom to represent the Industry to Congress, to allied food and food-processing industries, and other top-level national organizations whose activities affect the manufacture, sales, and use of pesticides.

The various staff members in turn, are being given added authority in their own areas and are being made directly responsible to the Board of Directors. The changes bring NAC's staff organiza-

tion in line with that of many other major associations headquartered in Washington, and equip it to meet the many dynamic challenges that now are facing the industry.

Insect Control Policies

One such challenge is how to establish reasonable policies for the control of pest eradication and massive insect control programs. Already, an "ad hoc" committee has been formed to coordinate such programs. Its members represent, USDA, U. S. Fish and Wildlife, the Food and Drug Administration, the Water Supply and Pollution Control Division of Health, Education and Welfare, and the Department of Defense.

Members of the committee disclose that their major objectives will include: 1) review all plans and probable effects before any new federal pesticide program is begun, and, 2) review all existing federal pesticide programs. Decisions of the committee will go to all state wildlife agencies, and it is contemplated that similar "ad hoc" committees may be set up on state and local levels. The decisions of these committees may not have much effect during this summer, but likely will apply to programs for the fall and beyond.

An optimistic view is that the committee will give the USDA's Agricultural Research Service a tribunal before which to argue for its programs and obtain a fair judgment before programs become footballs for attacks by either misinformed people or by the "professional" anti-chemical groups.

As was expected, Congressman John D. Dingell, of Michigan, has

reintroduced a bill calling for coordination between federal and state agencies on the administration of pest control programs. A similar bill died in the last session of Congress.

Bankers Advise Farmers

Bankers are getting more and more into the business of counseling farmers on farm practices. At a select meeting here, R. B. Toottell, Governor, Farm Credit Administration, disclosed that a growing number of bankers were offering constructive counseling.

He gave the example that a banker might advise a farmer that the bank could not lend him money for 100 pounds of fertilizer, but could lend him money for 300 pounds. The reason being that application of the larger amount would be needed for the farmer to make a profit and thus be able to repay his loan.

Some private bankers at the same meeting took a different position. They said they would rather have the county agent counsel farmers on how to manage their farms for a profit, and themselves stick to money matters.

Despite this latter view, lenders are finding it necessary to take a closer look at farm practices as a basis for lending capital. In this age of growing need for capital on the farm, the bankers — whether cooperative or private — are bound to become more important.

The National Plant Food Institute long has cooperated with bankers, and is keeping them informed on the profit-making potentials of fertilizer use. Now, the National Agricultural Chemicals Association is stepping up its program to tell its story to bankers. A first step is the article on "Increasing Farm Production Through Chemicals" by NAC's Information Director Denis Hayley in "Banking," the journal of the American Bankers Association.

Assistance for Scientists

A little known aspect of Dr. B. T. Shaw's work in the Agricul-

tural Research Service is his effort to improve the effectiveness of ARS scientists. This is a problem shared by many firms. Dr. Shaw's view is that ARS has some of the finest agricultural scientists in the country. What is lacking, he says, is adequate operating money for sub-professional labor to carry out effective programs.

In testifying before the House Appropriations Sub-Committee on Agriculture, Dr. Shaw made a special plea for strengthening ARS' budget so that ARS can give its scientists "extra hands that would plough their fields for them, wash laboratory dishes, and so on, which a laborer can do just as well as a scientist, and do much more cheaply."

Dr. Shaw estimates that this additional help would enable scientists to devote more scientific brainpower for the research programs, and "could increase our effectiveness from 25 to 50 percent without hiring other scientists."

The training of technicians and assistants at sub-professional levels long has been a major interest of a number of leaders within the National Agricultural Chemicals Association. In urging young people to take up careers in agricultural research, NAC has made the point that there are opportunities in industry as well as in government for technicians with less than a full scientific degree.

NAC's career material says, "A technician who can be depended upon to carry out details of a carefully planned experiment is extremely valuable to the professional scientists." Now, as demands upon the time and talent of professional scientists grow, so does the need for technicians on sub-professional levels.

The real pinch comes, says Dr. Shaw, because the cost of research is going up at the rate of 7 percent a year. The only chance to cut back on costs for the research results obtained is to make research more efficient through the use of more sub-professional people.★★

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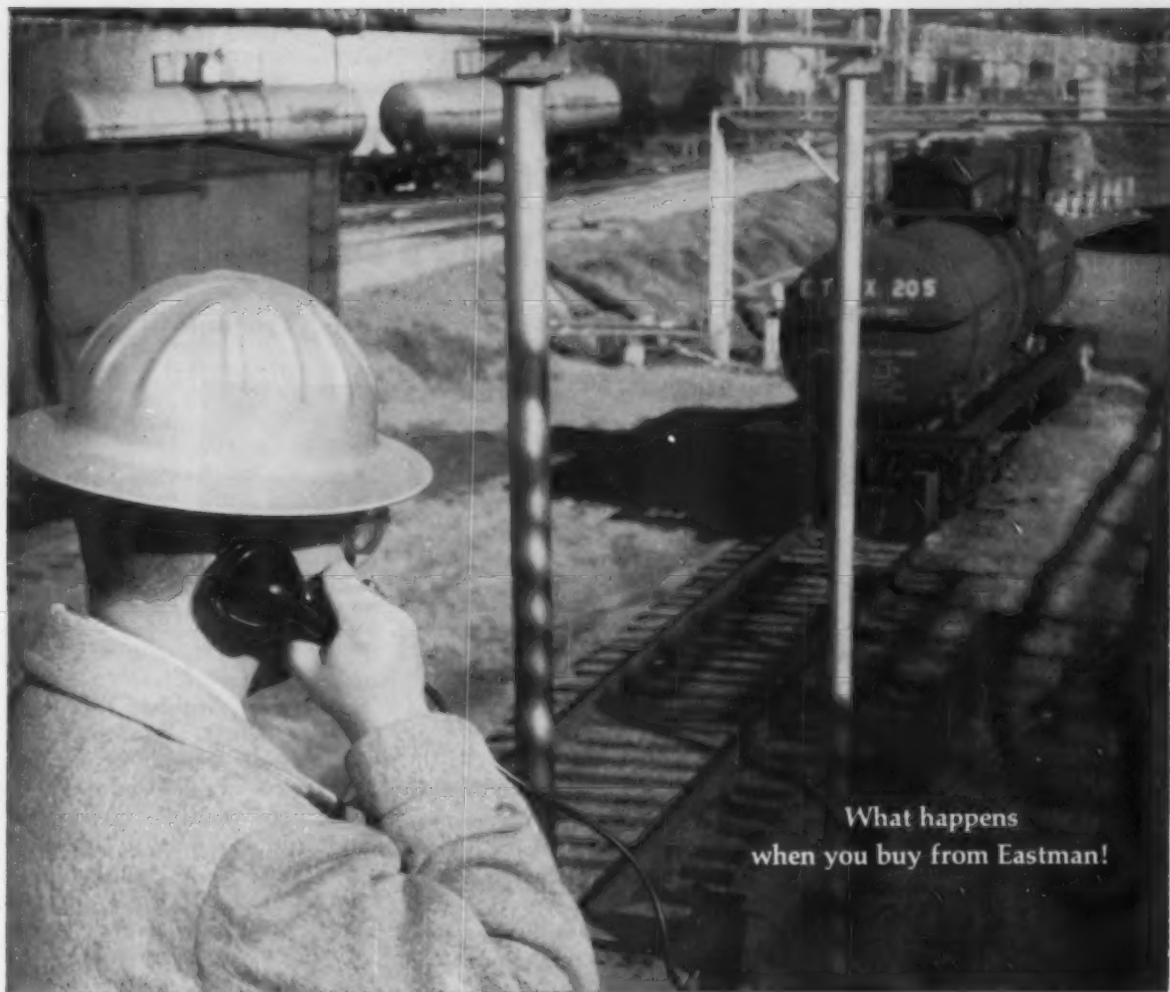
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even originate at our plant. It came from another supplier whom he had been unable to reach by telephone.

"The situation was further complicated by the fact that not only was his unloading foreman off sick but this was the first time they had ever received this particular material. He said he did have a fresh-out-of-college chemical engineer handy, but this young man had assured him that tank car unloading had not been a prerequisite for his degree. I thought maybe I could work it out with him over the telephone anyway, so I asked if

I could talk to the new alumnus.

"Well, I outlined the entire procedure covering everything from foot valves to vent seals. Then he said, 'Would you run that by again?'

"So I did, several times. And about fifteen dollars later we had the tank car hooked up and unloading. And I now know a proud young chemical engineer who could probably unload a tank car blindfolded—because he had to learn it the hard way."

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NEWS ABOUT THE



TRADE

Kapusta Joins PCA

Dr. Edwin C. Kapusta has joined the Potash Company of America, Denver, Colo., as technical sales director. In this capacity, he is responsible for technical service to customers, sales to the chemical industry, liaison between PCA production and sales, and market research and analysis.

Dr. Kapusta previously was with the National Fertilizer Association and the U. S. Borax & Chemical Corp.

Horsey Joins Tenneco Oil

James F. Horsey, Jr., formerly with Signal Oil & Gas Co., Houston, Texas, has joined Tenneco Oil Co., a division of Tennessee Gas Transmission Co., also of Houston.

Tenneco currently is building a major complex of petrochemical plants on its 794-acre Houston Ship Channel property. Among the products to be produced are ammonia and methanol.

Commonwealth Elects Hicks

Joseph A. Hicks has been elected president and general manager of the Commonwealth Fertilizer Co., Russellville, Ky. He succeeds Nat H. Love as president.

NPFI Budget Reduced

Some reduction in the staff of the National Plant Food Institute is expected following the adoption of a reduced budget at the organization's annual convention June 9.

John W. Hall, newly-elected chairman of the board of directors of the institute, said that the reduction will not impair the program of the institute, although some reduction in personnel will be necessary, and the "regional ap-

proach to the problems of industry and agriculture will be continued, largely within the present operational framework."

Eastern Show To Be Largest

The Eastern Lawn, Garden & Allied Products Trade Show to be held at the Coliseum in New York, October 20 to 22, is expected to be the largest trade show devoted exclusively to garden supply ever held. It will be the only show of its kind to be held in the East this year.

IMC Names Regional Mgrs.

The Materials Department of International Minerals & Chemical Corp. has announced the promotion of two district sales managers to regional sales managers. Thomas A. Bruns, formerly in charge in Columbus, Ohio, is the new regional sales manager in New York, covering a 13-state area.

Judson H. Drewry, Jr., Maitland, Fla., has been named regional sales manager at Atlanta, covering a six-state area.

Sales Mgr. for Olin Ag-Chem

L. S. Madsen has just been named general sales manager for the agricultural chemicals operations of Olin Mathieson Chemical Corp. He was formerly general manager of the western district at Phoenix, Ariz. He will be located in Little Rock, reporting to Gerald A. Wakefield, director of sales.

Edward W. Abrahams succeeds Mr. Madsen as general manager of the western district.

Paul F. Schowengerdt has been made special assistant to the director of sales. He was formerly general sales manager.

Heads Cyanamid Of Canada

Burton F. Bowman, formerly assistant general manager of American Cyanamid Company's agricultural division has been elected president of Cyanamid of Canada Ltd., Montreal. Mr. Bowman joined Cyanamid as general manager of the fine chemicals division in 1954, was named marketing director of the agricultural division in 1958, and assistant general manager of the division in 1960.

Dorr-Oliver Acquires Titlestad

Dorr-Oliver Inc., Stamford, Conn., will acquire the business and assets of Titlestad Corporation, New York, at or about the end of June, according to a joint announcement by D-O president Lloyd R. Boling and Titlestad president George B. Knecht. Nearly all of the Titlestad staff will move to the D-O headquarters in Stamford in July, with Mr. Knecht continuing as manager of D-O's new Titlestad division.

Monsanto To Build In Iowa

Monsanto Chemical Co., St. Louis, Mo., will build a 15,000-ton anhydrous ammonia terminal at a site four miles south of Muscatine, Iowa, on the Mississippi River. Construction of the storage facility is expected to be completed in December.

New Ammonia Terminal in Ill.

An anhydrous ammonia terminal is under construction for the American Oil Co. at Joliet, Ill.

The terminal is located next to the Amoco Chemicals Corporation plant on the Des Plaines River. Storage will be provided for 15,000 tons of anhydrous ammonia in a low-pressure refrigerated tank.

NPFI Manual on Analysis

The NPFI Chemical Control Committee has prepared a "Manual of Recommended Methods of Chemical Analysis." This manual comprises the official methods of the AOAC, and is rewritten in more detailed form, representing the composite experiences of a number of competent chemists in the fertilizer industry. The Manual is being distributed by NPFI to its members.

The more detailed summary of the AOAC methods in the new NPFI Manual should enable fertilizer control laboratories, analyzing the same material, to follow prescribed procedures more rigidly and thus obtain analyses that correspond more closely.

Escambia Moves and Expands

Escambia Chemical Corp. has expanded its Atlanta operations and moved into new and larger quarters at 3330 Peachtree Road, Atlanta, Ga.

The Atlanta branch will serve as the company's national nitrogen sales office under the direction of James A. Hunter, sales manager for nitrogen products.

Nelson Joins Pennsalt

Dr. Russell T. Nelson has been appointed assistant supervisor of the agricultural chemicals section, Technical Development Department, Pennsalt Chemicals Corp., Philadelphia. He had been agronomist for Great Western Sugar Co., Longmont, Colorado.

Heads Armour Research

Dr. Ernest Csendes, formerly a research chemist in the Pioneering Research Division of E. I. du Pont de Nemours & Co., Wilmington, Del., has been named research director of Armour Agricultural Chemical Co., Atlanta, Ga.

Second Aerial Short Course

The second annual Aerial Applicator Short Course, sponsored by the School of Aviation at Ohio State University, Columbus, Ohio,

will be offered September 5 through October 6.

The course program will consist of approximately 125 hours of instruction in actual field operations. The classroom phase will include 100 hours of instruction covering insecticides, insects, care and maintenance of aircraft, and pesticide regulations. Enrollment is limited to commercial pilots.

Fraser Heads Chipman Ltd.

D. R. Fraser has been appointed president of Chipman Chemicals Ltd.,



D. R. Fraser



J. H. Ross

Hamilton, Ontario, Canada. He succeeds J. H. D. Ross, who has retired from the company. Chipman Chemicals Ltd. is an associate company of Canadian Industries Ltd., Montreal, and Chipman Chemical Co., Bound Brook, N. J.

Mr. Fraser joined C-I-L in 1939 and last year was named vice president of Chipman Chemicals.

Agricultural Engineers Meet At Ames, Iowa

Granular insecticides are as good as or better than spray treatments for controlling European corn borer on field corn in the opinion of T. A. Brindley, Iowa State Univ. entomologist who addressed the 54th annual meeting of the American Society of Agricultural Engineers held at Ames, Iowa, June 25-28. He suggested that formulation could be improved to provide granules of more uniform size which would not crumble, and with which it would be possible to achieve control with smaller amounts of insecticides. Granular applications, he observed, leave much smaller residue deposits than do sprays on leaves and husks of corn.

Mr. Brindley recommended the following formulations for granules: 5% DDT at 20 lbs. per acre; 1% EPN at 20 lbs. per acre; and 10% toxaphene at 15-20 lbs. per acre.

Linerboard Price Cut

International Paper Co., New York, has reduced the price by 10 percent on its main grade of kraft unbleached linerboard for customers east of the Rocky Mountains. The adjustment makes the company's price for linerboard uniform over the country.

Safety Congress Oct. 16

The 1961 annual convention of the National Safety Council will be held in Chicago, October 16 to 20. Fertilizer safety sessions will be held in the Pick-Congress Hotel.

Cyanamid Appoints Grupinski

Raymond S. Grupinski has been appointed administrative assistant to the northeastern regional manager by American Cyanamid Co.'s agricultural division. He has been with Cyanamid seven years.

Acme Names Vice Presidents

Acme Fertilizer Co., Acme, N. C., has elected Newton J. Kelly and W. Clark Bellamy to be vice presidents of the company.

George M. Beal and Joe M. Bohlen, Iowa State University sociologists, reported results of some of their surveys on use of agricultural chemicals by Iowa farmers. Nine out of ten farmers are using at least one agricultural chemical product, however most of them were using agricultural chemicals only on a limited application basis.

Many of the factors limiting increased use of agricultural chemicals by farmers appeared to indicate lack of knowledge about these products and their potential. Farmers who kept records and used them as basis for their purchasing decisions used significantly more agricultural chemicals.

Limiting factors mentioned most frequently were as follows: (1) using all I need (2) lack necessary application equipment (3) application takes too much time during busy season, and (4) risk and uncertainty involved.

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*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products



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FMC Name Adopted

Food Machinery and Chemical Corp., San Jose, Calif., has changed its name to FMC Corporation. FMC Chairman Paul L. Davies said that the company had outgrown its name. "We have always been a leading supplier of machinery and equipment for the food industry," Mr. Davies said, "but in relation to our pattern of growth in other directions, 'food machinery' sales represent less than one-fourth of our total business volume."

The physical changeover to the new name will proceed gradually throughout the balance of the year and FMC expects that the new name will be used by all operations in the United States and abroad by Jan. 1, 1962.

NAC Staff Reorganized

The National Agricultural Chemicals Association has approved an organization plan providing for a chairman and vice chairman of the board of directors, whose method of election and duties will be the same as now prescribed for the president and vice president of the association. A full-time president will be named to replace the present position of executive secretary.

In addition, a secretary, treasurer, technical director, and director of information also will be named.

Named by the board of directors to fill these positions until Sept. 1, the beginning of the association's fiscal year, were Dr. George R. Ferguson, president of Geigy Agricultural Chemicals, division of Geigy Chemical Corp., Ardsley, N. Y., chairman of the board; H. F. Tomasek, president of Chemagro Corp., Kansas City, Mo., vice chairman of the board; L. S. Hitchner, president of the association; Jack Dreessen, secretary; Miss Lee H. Grobe, treasurer; J. A. Noone, technical director; and Denis Hayley, director of information.

Dr. Ferguson, in announcing the reorganization, stated that "This reorganization plan for the

NAC association creates career positions for all operating units of the association staff, with duties and responsibilities clearly defined."

Ammonia Plant Preview



William M. Miller, (left) plant manager, and Gayle H. Nichols, operating foreman, examine details of a scale model of the ammonia plant that will be one of four units at California Chemical Co.'s \$22,000,000 plant food operation now under construction at Fort Madison, Iowa.

The model is being used as a construction guide. Other plants at Fort Madison will include a nitric acid plant, an ammonium nitrate plant, and a complex fertilizer plant.

Penick Shifts Lacey

William F. Lacey has been appointed sales representative for Brooklyn, Long Island, and Staten Island, N. Y., for S. B. Penick & Co., New York. Mr. Lacey, who joined Penick in 1955, formerly served in an inside sales capacity.

Aamodt Joins Sprayfoil

Thomas T. Aamodt, an entomologist for the past ten years with the Minnesota Department of Agriculture, division of plant industry, has joined Sprayfoil Corp., Bloomington, Minn., as manager of the agricultural sprayer products division.

Pacific Guano Moves

Pacific Guano Co. has moved its main office from Berkeley to Los Angeles, California. The new address is 714 West Olympic Boulevard, Los Angeles 15.

Dow Acquires Full Ownership

The Dow Chemical Co., Midland Mich., has acquired all the shares in Dow Agrochemicals Limited, its British subsidiary.

Dow Agrochemicals, established in 1958, manufactures and markets Dow agricultural chemicals in the United Kingdom and in several Commonwealth countries. Dow previously owned 74 per cent of the capital and the rest was in British hands.

Dr. Walter E. Ripper continues as managing director of the subsidiary.

New Nabam Formulation

Stauffer Chemical Co., New York, now is marketing a new dry form of nabam under the trade name Nabam 93-SP. It is an instantly soluble, yellow, free flowing powder which is mixed with a metallic sulfate for fungicidal application.

Nabam formerly was available only in liquid form.

To Build At Pine Bend

Northwest Co-operative Mills., Inc., St. Paul, Minn., plans to build a fertilizer plant at Pine Bend, a big industrial complex on the Mississippi River near Hastings, Minn. The plant will be designed to produce 100,000 tons of water soluble ammonium phosphate fertilizer annually.

Northwest Mills., a co-operatively owned feed, seed, and fertilizer processing company, already operates fertilizer plants at Winona, Minn., and Green Bay, Wisconsin.

Ortho Names Pair

Douglas D. DeWitt has been appointed a sales representative for Ortho pesticide and plant food products in the Santa Cruz area of California by the Ortho Division, California Chemical Co., Richmond, Calif.

In another move, the company has announced the appointment of John B. Harris as branch manager of the Ortho agricultural products sales office in Santa Maria, Calif.

New AC Representative

Rodman Zilenziger has joined **Agricultural Chemicals** as a district sales representative. He had served in a similar capacity with **Farm Chemicals** for the past five and one-half years.

Prior to this, Mr. Zilenziger had been a sales representative for **Shaw-Walker Co.**, maker of accounting systems. He is a graduate of Pennsylvania Military College.



Jonnard Named By U. S. I.

Dr. Aimison Jonnard has been named manager of market research and development for **U. S. Industrial Chemicals Co.**, Division of **National Distillers and Chemical Corp.**, New York. Prior to joining U.S.I. in 1959, Dr. Jonnard was manager of **Shell Chemical Co.**'s market analysis department.

Foxboro Assembly Plant

An assembly plant in East Bridgewater, Mass., was opened June 5 by the **Foxboro Co.**, Foxboro, Mass. The 40,000 sq. ft. plant is being used for the manufacture and assembly of electronic "Con-sotrol" instruments used in process control systems.

Joins Atlantic-Vulcan

John F. Kruysman has joined **Atlantic-Vulcan Steel Containers, Inc.**, Birmingham, Alabama, as factory sales-service representative.

Added Huber Research Lab.

J. M. Huber Corp. is building a new research laboratory and administration building at Havre de Grace, Maryland. Completion is scheduled for September.

The new structures will augment plant facilities devoted to the

manufacture of chemicals and synthetic pigments for the paint, paper, pesticide, ink, and rubber industries.

H. V. Howes Retires

H. V. Howes, vice president and director of sales for **Bemis Bro. Bag Co.**, St. Louis, Mo., retired May 30. He is continuing as a company director. Mr. Howes joined Bemis in 1920 and has been located at St. Louis throughout his entire 40-year career with Bemis. He was named director of sales in 1942 and was elected a vice president in 1946.

Richardson Fills New Post

Derek Richardson has been appointed to the newly-created post of vice president for marketing of the **Chemicals Division** of **Olin Mathieson Chemical Corp.**, New York. Mr. Richardson joined Olin in 1939 and was a member of the **Chemicals Division** until 1958, when he transferred to the **Metals Division**.

To Form Research Firm

Agri Research Inc., a new agricultural research company, will be established in Manhattan, Kansas. The company plans to provide research services to the government and to fertilizer, grain, farm machinery and meat packing industries.

Bemis Names Pair

R. P. Perry has been appointed to **Bemis Bro. Bag Co.**'s newly-created position of director of product development. His headquarters are in Minneapolis, Minn. Mr. Perry is succeeded as manager of the company's Minneapolis plant and sales division by **Dexter A. Clark**.

Pelitti Joins C & I

Enrico Pelitti has been appointed manager of the new phosphate division of **Chemical and Industrial Corp.**, Cincinnati, Ohio, and its subsidiary, **Girdler Corp.**, Louisville, Ky. Under Mr. Pelitti's direction, the new division will broaden its activities to offer processes for an electro thermal type phosphoric acid, superphosphates, ammonium phosphate fertilizers, and related products.



Mr. Pelitti previously was associated with **Dorr-Oliver, Inc.**, Stamford, Conn., and the **Chemical Construction Corp.**, New York. He is well-known in the fertilizer industry for his contributions as a designer of many of the phosphate plants constructed in recent years, both in the United States and abroad.

ESA To Meet In Miami

The ninth annual meeting of the **Entomological Society of America** will be held November 27 to 30 at the **McAllister Hotel** in Miami, Florida.

Jersey Resumes Air Spraying

New Jersey has begun its annual spraying of DDT from aircraft to control mosquitos in its shore counties. Dr. Bailey B. Pepper, secretary of the **State Mosquito Control Commission** and chairman of the **Department of Entomology** at **Rutgers University**, estimated that the program will cost \$100,000.

The spray, to be used only in those counties requesting it, is at a strength of one-tenth of a pound of DDT dissolved in a quart of oil. Dr. Bailey said that this will be non-hazardous to fish and wildlife.

Chipman Advances Pair

Chipman Chemical Co., Bound Brook, N. J., has appointed **H. W. Swenson** as treasurer and **W. J. Jankowski** as assistant treasurer.

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PRODUCT

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Schelm Joins NFSA

W. Harold Schelm has joined the National Fertilizer Solutions Association and will serve as executive secretary of the association. At the same time, the association has announced that its headquarters are being moved from Chicago to room 901, Jefferson Building, Peoria, Illinois.



Mr. Schelm was one of the original founders of NFSA and formerly headed a company that manufactured tanks and application equipment used by the fertilizer solutions industry.

In-Plant Food Service

Of interest to many companies will be a new program of institutional mass food services offered by the Brass Rail organization, a New York-based food service chain. The project combines flash freezing of hot main courses and disposable packaging for use in new automatic vending machines. Average cost for full-course hot meal: 60 cents. Menu: sixty hot selections, variety of salads, sandwiches, soups, and beverages.

The initial Brass Rail automatic service cafeteria is in operation at the Westinghouse Electric Corp. plant in Boston.

Science At Work Day

A special exhibit on soil testing and the work of the late M. F. Morgan will be part of the Science at Work day of the Connecticut Experiment Station on August 9. The all-day field meeting is to be held at Lockwood Farm in Mt. Carmel, Conn., a few miles north of New Haven.

Mr. Morgan was the developer of a universal buffering solution used to remove a portion of plant-available nutrients from soil samples.

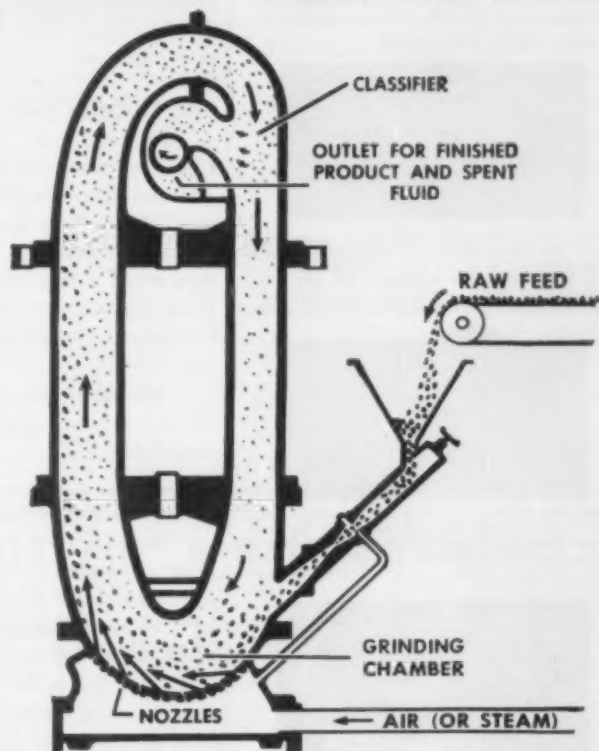
Co-ops purchase Plant

Two Iowa cooperatives — the Calmus Cooperative Elevator Co. and the Clinton County Consumers Cooperative Association at De Witt — have jointly purchased an anhydrous ammonia plant at Grand Mound, Iowa.

for

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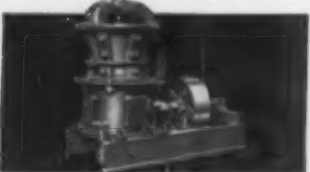
Sturtevant Construction Assures Long Mill Life at Top Loads

Sturtevant crushing and grinding machinery answers the long life top-load production problem for medium to small size plants. Many Sturtevants have been operating above rated capacities for more than 25 years, and without a major repair.

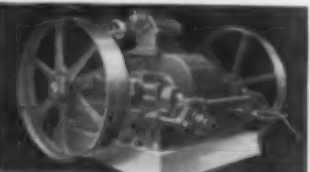
"Open-Door" design gives instant accessibility where needed — makes cleanouts, inspection and maintenance fast and easy. Machines may be set up in units to operate at equal quality and capacity.



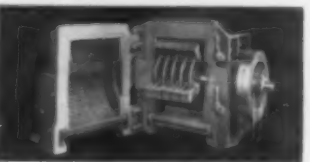
Jaw Crushers — Produce coarse (5 in. largest model) to fine (1/4 in. smallest model). Eight models range from 2 x 6 in. jaw opening (lab model) to 12 x 26 in. Capacities to 30 tph. All except two smallest sizes operate on double cam principle — crush double per energy unit. Request Bulletin No. 062.



Rotary Fine Crusher — Reduce soft to medium hard 3 to 8 in. material down to 1/4 to 1 1/4 in. sizes. Capacities up to 30 tph. Smallest model has 6 x 18 in. hopper opening; largest, 10 x 30 in. Non-clogging operation. Single handwheel regulates size. Request Bulletin No. 063.



Crushing Rolls — Reduce soft to hard 2 in. and smaller materials to from 12 to 20 mesh with minimum fines. Eight sizes, with rolls from 8 x 5 in. to 36 x 20 in.; rates to 47 tph. Three types — Balanced Rolls; Plain Balanced Rolls; Laboratory Rolls — all may be adjusted in operation. Request Bulletin No. 065.



Hammer Mills — Reduce to 20 mesh. Swing-Sledge Mills crush or shred medium hard material up to 70 tph. Hinged-Hammer Pulverizers crush or shred softer material at rates up to 30 tph. Four Swing-Sledge Mills with feed openings from 6 x 5 in. to 20 x 30 1/2 in. Four Hinged-Hammer Pulverizers with feed openings from 12 x 12 in. to 12 1/2 x 24 in. Request Bulletin No. 084.

*Reports Manager W. Carleton Merrill concerning Sturtevant Swing-Sledge Mill at James F. Morse Co., Boston.

STURTEVANT MILL COMPANY

123 Clayton St., Boston 22, Mass.

Scott Heads Bemis Sales

Richard V. Scott, vice president and assistant director of sales for the Bemis Bro. Bag Co., St. Louis, has been named director of sales for the company. He succeeds H. V. Howes, who retired May 31 after 40 years with Bemis.



Mr. Scott has been with Bemis since 1931. He became manager of the Chicago general sales division in 1951 and, in 1957, was named director of eastern operations for the company. He was elected a director of the company in 1959 and a vice president in February, 1960.

IMC To Offer DAP

International Minerals & Chemical Corp., Skokie, Ill., will add diammonium phosphate to its line of fertilizer ingredients late this year. IMC plans a \$3.8 million expansion project at its Bonnie, Florida, phosphate chemicals plant. Completion is scheduled for Oct. 31.

The new product will contain 18 per cent nitrogen and 40 per cent P_2O_5 .

Chemical Research Director

Dr. Howard Steinberg has been appointed director of chemical research for United States Borax Research Corp., Anaheim, Calif., a wholly-owned subsidiary of United States Borax & Chemical Corp., Los Angeles. Dr. Steinberg, who joined U. S. Borax Research in 1954, has been associate director of chemical research.

Israel To Offer Phosphates

Israel plans to enter the world export competition in finished phosphate products. The government-owned Negev Phosphate Company is beginning a project to provide for an annual output of 200,000 metric tons of calcined phosphates, and the manufacture of concentrated phosphoric acid fertilizers.

Donald Palmer, Inc., Moves

Donald Palmer, Inc., a manufacturer of specialty packaging, has moved into a new, 20,000 square

foot plant in the industrial section of New Orleans.

To Build In Norway

Norsk Koksverk, a Norwegian state-owned company, is planning to build an ammonia plant with a capacity of 50,000 metric tons per year.

NC Branch Meeting July 5

The North Central Branch of the American Society of Agronomy will meet at the University of Wisconsin, Madison, July 5 and 6. Meeting sessions will be held in the Memorial Union.

Among the topics to be discussed are "Nutrient Retention by Soils and Release to Crops," "Influence of Environmental Factors in Plant Growth," and "The Future of Research."

New Biological Insecticide

Grain Processing Corp., Muscatine, Iowa, has developed a new biological insecticide, Parasporin. It is a culture of *Bacillus thuringiensis* (Berliner).

In tests conducted by the company, Parasporin has controlled cabbage worms, cabbage looper, artichoke plume moth, tobacco hornworm, alfalfa caterpillar, and housefly larvae.

Complete Plant Being Moved

J. R. Simplot Co., Pocatello, Idaho, is moving a complete fertilizer plant to Pocatello from Anaconda, Montana, more than 250 miles away. The task, which is being carried out for Simplot by the Austin Co. of Seattle, Wash., is being accomplished by dismantling the ammonium phosphate plant at Anaconda and moving the components by truck and rail to Pocatello and re-erecting the production facilities in new buildings.

The Montana plant was purchased by Simplot last year from the Anaconda Co. The move is being made to integrate fertilizer production facilities of Simplot's minerals and chemicals division and to bring the plant nearer to the supply of raw materials.

AGRICULTURAL CHEMICALS

SW Fertilizer Conference And Grade Hearing July 19-22

The Planning Committee for the Southwest Fertilizer Conference and Grade Hearing. Standing (left to right): Jack Lindsey, International Minerals & Chemical Corp.; E. K. Chandler, NPFI; G. H. Wakefield, Olin Mathieson; Mrs. & Dr. J. F. Fudge; Mrs. Beauboef; Dr. & Mrs. N. D. Morgan, American Potash Institute; Stafford Beauboef, John Deere Chemical Co.; Mr. & Mrs. A. T. Edwards, Red Star Fertilizer Co.; Mrs. Wakefield; Stanley Hackett, Dixie Fertilizer Co.; and Harold



Trammell, Farmers Fertilizer Co. Seated (left to right): Mrs. Jack Lindsey, Mrs. Hackett, Mrs. Trammell, and Mrs. Chandler.

"FERTILIZER Needs and Consumption in the Southwest will be the theme of the Southwestern Fertilizer Conference and Grade Hearing, to be held July 19-22 at the Galvez Hotel, Galveston, Texas.

A panel, moderated by John E. Hutchinson, director of the Texas agricultural extension serv-

ice, will discuss the subject "Where are We and Where Should We Be?" Participants will be Woody Miley, extension soil specialist, Arkansas; John Cox, state agent, Louisiana; Dr. L. H. Brannan, director of the Oklahoma agricultural extension service; and Dr. W. F. Bennett, extension soil specialist for the state of Texas.

A second panel will discuss "How are We Going to Get There?" The moderator will be Dr. Samuel Tisdale, Sulphur Institute. Among other speakers scheduled for the meeting are Kenneth Bates, U. of Arkansas, "Teaching the Farmer"; Murray Rennick, Rollo Feed Mills, Rollo, Mo., "How a Dealer Does it"; and M. E. Wierenga, Ortho Division, California Chemical Co., "Selling the Potential."

Montrose Merger Approved

The merger of Montrose Chemical Co., Baldwin Rubber Co., and Centlivre Brewing Co., has been given the final approval by stockholders of all three firms.

Baldwin Montrose Chemical Co., the surviving firm, had combined 1960 sales of \$30 million. Baldwin Montrose also has a 50 per cent interest in an affiliate, Montrose Chemical Corp. of California, whose 1960 sales totaled \$18 million.

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EDITORIALS

(From Page 13)

"know how" and skill in using the lowest cost material (imperfect, of course) to produce a good product.

In a more practical vein, it was pointed out that the simple way to control standards of raw materials is not to buy from those suppliers who cannot meet one's requirements. This particular opinion is, of course, the basis of the free enterprise system and, as another manufacturer put it, "It is only through the individual initiative and research of the various companies who provide us with raw materials, that we are being constantly offered better materials at the same or lower price."

New Fertilizer Plants

Kansas

United Cooperatives, Inc., with headquarters at Norton, Kans., is adding a nitrogen solutions plant in Alameda, Kans.

Mississippi

Southeastern Liquid Plant Food Company, a \$500,000 liquid fertilizer manufacturing operation is planned for Vernon Lee County, Miss. by DeWitt Walcott, Jr., of Greenville, Miss. Other similar plants are to be located in Alabama.

Morocco

The Moroccan government-owned agency, OCP, has engaged Dorr-Oliver, Inc., to study the feasibility of a new phosphate rock drying process together with the possible use of nuclear power as a fuel source.

STANDARDIZATION

(From Page 21)

Uniformity could also be extended to specifications with regard to moisture, free acid, CaCO_3 equivalent.

"Self imposed standards which are ethically administered should

then be rewarded by the formulators with patronage as deserved.

"Shrinkage and overformulation losses represent what should be profit. Unfavorable public images created by State reports of be-

low minimum analyses injure the industry by questioning the honesty of formulators and destroying confidence of the ultimate buyers.

"Basic suppliers can't do it all, but can help a great deal."

Efficient Use of Low-Cost Ingredients Would Keep Production Costs Down

AN interesting point is raised by still another participant in the *Agricultural Chemicals* survey. This participant suggests that there is still considerable virtue in applying exceptional "know how" and technique in using the lowest cost material (imperfect of course) instead of asking for perfection in raw materials and paying for that perfection. His comments follow:

Cost of Production and Uniformity of Ingredients

"At considerable cost to the suppliers, the chemical analysis of most basic fertilizer ingredients is now held within quite reasonable limits. However, the variations in a product even by the same supplier from one shipment to the next are often great enough to justify the fertilizer manufacturer in formulating specifically for each lot. This often requires separate storage facilities with added costs, and the possibilities for errors that normally exist are increased.

"Why can't the suppliers furnish ingredients which are so uniform in analysis and in physical properties that no changes in formulation and operations will be required on the part of the fertilizer manufacturer?

"The nature of the processes and the products of some industries demand very precise chemical and physical qualities in the ingredients, and their high prices reflect the costs of such perfection.

"The lot of every operator would be a more happy one if he could be spared the need for adjusting his operations to any variable factor. This often would require that an ordinary ingredient which could readily be used in the

well-rounded plant would have to be upgraded at a price to accommodate the less versatile customer.

"As one ingredient may serve both chemical and physical ends, situations develop wherein the efforts by a supplier to ease some customer's production problem may yield undesirable results elsewhere. For instance, some time ago, to increase production in the granulation of fertilizer, some triple superphosphate was obtained already granulated at prices that seemed attractive.

"In quite a few cases, ironically, it developed that actually less production resulted because the ammonia take-up of that triple superphosphate had been reduced to 1.5 pounds per unit of its P_2O_5 due to the hard surface and large particle size. The industry had recently adjusted upward to 3.5 pounds of ammonia per unit of P_2O_5 . To neutralize the ammonia that was not being reacted with the new granulated triple superphosphate and to supply some of the heat required for granulation, many operators then added sulfuric acid at considerable cost and trouble.

"Another result of poor ammonia take-up was further overloading of the dryer, with the troubles which attend this common malpractice.

"For years the simple operations of the fertilizer industry were well able to utilize ingredients which were to be had at relatively low costs. Recently the industry has become much better equipped through well-trained men with good equipment and processes. So equipped, perhaps, the industry should now search for means of

efficiently using the maximum amount of the lowest cost ingredients, rather than ask for perfection

and completeness in the raw materials at the going price for perfection."

Standard Specifications and Procedures Needed Between Producers and Users

CONSIDERABLE dissatisfaction with particle size of triple superphosphate materials supplied Wisconsin Farmco Service Cooperative, Madison, Wisc., is expressed by M. M. Shihata, director of quality control.

"We had excessive nitrogen losses up to an extra 0.5% when triple was too coarse (70% + 20 mesh)," writes Mr. Shihata. "We had excessive fines in the finished product when the triple was too fine (11% + 20 mesh). We lost more than 1% P_2O_5 in some cases when we tried to average out the APA. Sometimes we have to resort to other phosphate materials to boost up the analysis of triple when it drops to 45% APA. But then again, in many cases, we have received what we ordered.

"To improve this mess, standard specifications and procedures should be worked out between the producers and the users, and on this basis I propose:

1. Express the material as Standard - Coarse - Granular
2. Chemical and screen analysis should be sent to the user within 2 days of shipping
3. The analysis sheet should show O.D. Moisture, TPA, APA, Screen analysis + 6, + 8, + 14, + 20, + 35, + 65 mesh.
4. For the standard material + 8 mesh 5-10%, + 20 mesh 30-40%, -65 mesh should not exceed 10%
5. Moisture content 3.5 + 5.0%
6. APA should be 47% + 0.5%

"For excessive deviation from the standards, I feel the supplier should make an adjustment to the user. I believe that a certain supplier or two with little extra effort could accomplish the above standards all the time,

"As an alternative, as long as most of the triple suppliers are in the mixed fertilizer business, may-

be they should send the substandard material to their own plants instead of spreading it all over the country. Then there would be no complaints."

Further comment on particle size of raw materials is offered by Walter R. Horn, general manager, Farmers Chemical Company, Joplin, Mo., who reports only a minor problem in connection with uniformity of raw materials. The raw materials supplied Farmers Chemical, he says, are sulfuric acid, anhydrous ammonia, phosphate rock and potash.

He indicates that potash received in his plant runs as follows:

Tyler Sieve	Per Cent
+ 20	8
+ 65	87
+100	95
-100	5

A more desirable screen analysis, indicates Mr. Horn, would be 100% Sieve 65, none on + 20 screen.

Editors Note: The above statement completes the comments received by *Agricultural Chemicals* in response to the survey on standardization of raw materials. In summary, fertilizer users agree, in general, that uniform terminology is most urgently needed; users are not in complete agreement on standardization of raw materials,—many feeling that the industry does not require or warrant such regimentation; — suppliers, of course, point out the impracticality of a "uniform" raw material. Major complaints of "users are that excessive fines are of ten found in phosphate materials, — and analyses of new material purchases are sometimes late in reaching them. The latter situation is certainly something that could easily be remedied by the supplier.

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Davies Nitrate Co.

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118 LIBERTY STREET NEW YORK 6, N. Y.

NPFI MEETING

(From Page 16)

"But," he questioned, "is it too much to hope that American business — and particularly that segment dealing directly with agriculture — will now pitch in and help to translate the facts about farmers and farming into an accurate image in the public mind?"

Referring to agricultural legislation proposed by the administration, he said that the administration does not consider the proposals it has put before Congress to be "engraved indelibly and immutably on stone."

"Since the first moment the bill was introduced — and even before," he said, "we have been in

consultation with congressional leaders whose long experience with agricultural matters makes their judgment invaluable.

"The proposed bill does not arbitrarily impose any program on any producer. It does not establish agricultural programs." Secretary Freeman said that the bill sets up procedures and guidelines under which programs can be worked out for all commodities "if, and only if, producers want them."

"I can assure you," he said, "that we are not seeking ways to regiment, control, regulate, or coerce American agriculture. We are trying to do just one simple, elementary thing — to give the farmer an even break in the economy of the United States."

American Farmers Are Using More Science And Technology

J. E. Streetman



"RAIN power is replacing horse power," according to J. E. Streetman, vice president and director of marketing, Ralston Purina Co., St. Louis, Mo., who said that each year American farms use more science and more technology.

The decline in farm population, he said, although viewed by some politicians with alarm, is in itself a sign of a strong, healthy industry. And, he added, the remarkable increase in production efficiency can be matched by no other sector of the American economy.

Mr. Streetman said that the man who needs the fertilizer industry's products is not going out

of business, he is going into a bigger business. "His investment is larger, his risks are greater," he said, "but this larger, more efficient farmer of today approaches his problems and studies his investments as does an industrialist. He demands of his suppliers technical competence and a clear understanding of his operating problems. As we learn to concern ourselves less about his size and more about his needs, we will earn not only his business, but his respect and his loyalty as well."

A full report on Ralston Purina's program for the retail dealer and the independent farmer can be found beginning on page 42 of this issue.



Changes Are Transforming U. S. Economic System

Pierre A. Rinfret

DR. Pierre A. Rinfret, vice president and director of the

economics division of Lionel D. Edie & Co., New York, listed six

major changes currently taking place in the economy of the United States which, he said, are transforming the nature of the U. S. economic system.

He pointed out that the age structure of the population is changing, with the younger age group growing "by leaps and bounds." Industry, he said, is changing its capital spending programs by putting an increasing part of its capital into research and development, and, also, is trying to reduce its capital investment in inventories. The consumer is changing his tastes, Dr. Rinfret said. He added that new industrial frontiers are emerging and, finally, the international position of the U. S. has changed.

"We are in the midst of profound and far-reaching changes in our economic structure," he said. "This has had the effect of slowing down our economic growth and we will continue at a slow rate for another few years."

"The anatomy of growth of American industries is changing," he continued. "The growth industries of the past fifteen years will not be the growth industries of the next ten years, industry growth rates are changing, new growth industries are emerging. The major growth industries of the decade of the Sixties are likely to be electronics, office equipment, space and missiles, drugs, housing, water & sewerage, and medical services.

"It is the very changing nature of the growth mix of American industry today that is a major factor in our lower rate of growth since 1955," he said.★★

DEALER SYSTEM

(From Page 43)

ing can be tailored and adapted to meet his needs.

The fourth cornerstone of the Archway Program is what Ralston calls the Big "C" — *Creating, Contracting, or Check-R-Mix*. In some areas, such as marginal farming areas, dealers must develop or

create new enterprises as their only source of new business. They must be prepared to furnish prospective growers with plans, sources of local capital, and all other essential elements of a sound operation.

The second of the three "C's" — contracting — applies to areas where growers are unwilling to assume the risks or furnish the capital for their own "growing-out" operation and the dealer's only avenue for growth is through contracting.

The third "C" — Check-R-Mix — refers to Purina's franchise for dealers in heavy grain areas who must provide grinding and mixing facilities to process the farmer's own grain as the only avenue of doing business with him.

The fifth cornerstone in the Archway Program is called *Proof Projects*. This covers a variety of methods of demonstrating beyond question the profitability of Purina feeding programs, but can just as well demonstrate the profitability of fertilization programs, for instance. Proof projects may consist of the dealer's own demonstrations or pilot projects, or they may consist of records on customer's operations showing the same facts. In whatever form, however, they provide dealers with some of the most powerful selling ammunition he can have. And more and more the large farmer of today cannot be sold with anything less than facts.

The sixth cornerstone is *Advertising and Promotion*. This term is self-explanatory and covers local advertising and display material provided to support the dealer. An important feature of the program is identification of the dealer's plant and facilities with the familiar Checkerboard trademark.

Ralston Purina calls the capstone of its Archway "Trained and Stimulated, High-Caliber Employees." This arch holds the six cornerstones together and makes them effective. The company's training program for its dealers and employees ranges in scope from a simple and basic correspondence course for new dealer

employees all the way up through training meetings held on a district level by the Purina salesman and on a division level by Purina sales managers and staff, to top-level schools held in the company's St. Louis headquarters for advanced personnel. In addition, there are retail management schools for sons of dealers and others assuming or about to assume management responsibilities.

Purina's salesmen are required to have a nucleus of key farmers in each market on whom they call personally. These key farmers usually are the largest and most influential in the market. They buy through the local dealer, but they are serviced and controlled by Purina's salesman. Should anything happen to the dealer, this nucleus of key farmers is invaluable to the salesman in retaining control of the market until he can find a new dealer.

Purina tells its dealers that there are four services for which retailers have traditionally charged:

they are sales and service, warehousing, delivery, and credit. Down through the years, and even today, many farmers need all four of these services.

When a dealer performs all four services for a customer he is entitled to charge a margin which will reimburse him for the expense of all four, plus a reasonable profit. But, when a farmer gets big enough, he sometimes buys his fertilizer right off the freight car and requires no warehousing service from the dealer. Or, he may have his own delivery equipment, and the dealer has no delivery expense. He may pay cash and require no credit.

In such cases, unless the dealer's margin is reduced, to recognize the reduction in services required or performed, he will not long hold that farmer's business.

This principle is fundamental to the industry's growth in the future. It is not a matter of price-cutting or margin-slashing in the ordinary usage of those terms —




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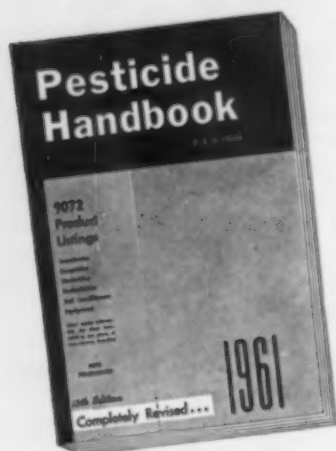
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about the editor —

Dr. Donald E. H. Frazer, Editor of *PESTICIDE HANDBOOK 1961*, is one of the leading authorities on the chemistry of pesticides. He is the author of "Chemistry of Insecticides and Fungicides," the first book dealing with this subject published in the United States. In addition he has written several other books, including "Chemistry of Insecticides, Fungicides, and Herbicides." Dr. Frazer is Professor of Agricultural and Biological Chemistry at The Pennsylvania State University.

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rather, it is a matter of charging for services rendered and the dealer, by providing needed services, earning his place in the chain of distribution.★★

FERTILIZER VIEWS

(From Page 34)

farms which strive for greater efficiency through the application of mechanics and chemistry in their operations. They cannot afford to tolerate waste and inefficiency. In the decade 1949-59 the number of farms in the U. S. declined by more than a million units. We now have only 3,700,000 farms with, however, little reduction in acreage of harvested cropland. These larger farm units are keyed to maximum efficiency at lowest cost.

It is significant that a number of fertilizer companies are beginning to emphasize service to "sell new fertilizers in a new way." One firm is currently using full page advertisements to explain its novel "program tailored to specific soils and crops that begins with planting and follows right through to plentiful harvest." It is to be hoped that such service also will aim to educate the farmer so as to enable him to make wise decisions on how to invest his fertilizer money. Fertilizer firms and their sales and technical staffs can enhance their prestige and profits by using the educational approach in their service to agriculture.★★

LISTENING POST

(From Page 57)

caused less injury and resulted in denser growth than treatment with organic mercurials. Phenyl mercury acetate in water solution applied at regular intervals gave good control. Addition of small amounts of calcium, potassium, or ammonium nitrate to the solution reduced phytotoxicity without appreciably affecting fungicidal activity.

A schedule alternating applications of phenyl mercury acetate and cadmium chloride was tried in

the fall of 1959, with encouraging results. Gould and his associates considered that the alternating schedule would probably provide the best means of controlling *Fusarium* patch, since it combined the fungicidal efficacy of the mercurial and the turf-encouraging properties of the cadmium compound.

Experimental Soil Fumigants

H. L. Rhoades (4), of the University of Florida, Central Florida Experiment Station, Sanford, Florida, tested two experimental formulations of methyl isothiocyanate recently released by the Morton Chemical Company for trial as soil fumigants. The chemical composition of EP-161 is 20% methyl isothiocyanate and 80% solvent. EP-162 is a 100% mixture containing methyl isothiocyanate and chlorinated C₃ hydrocarbons.

In a preliminary small-plot experiment, with okra as the test crop, the two materials were compared for control of root-knot nematodes (*Meloidogyne incognita* var. *acrita* and *M. javanica*) and for effects on plants with 1,3-dichloropropane (D-D, Vidden D); 1,3-dichloropropene (Telone); 1,3-dichloropropene 75.2%, 1,2-dibromoethane 18.7% (Dorlone); 1,2-dibromoethane 83% (Dowfume W-85); 1,2-dibromo-3-chloropropane (DBCP) 8.6 pounds/gallon (Nemagon); sodium methylthiocarbamate (SMDC); and 3,5-dimethyltetrahydro-1,3,5, 2H-thiadiazine-2-thione (Mylone 85W). Treatment with EP-162 resulted in outstanding nematode control. Only Mylone 85W proved superior to EP-162 as regards either plant growth or nematode control on treated plots. Plant growth on plots treated with EP-161 was as good as on EP-161-treated plots, but nematode control was somewhat less effective.

A second experiment compared the two experimental fumigants more thoroughly with Dowfume W-85 and D-D, the most used nematocides in the Sanford area of Florida. Ratings were based on plant growth, early weed control,

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and nematode control. Test plants were snap beans, okra, and cucumbers. Both EP-161 and EP-162 provided better weed control than the other materials. Excellent nematode control, about equal to that in the D-D and Dowfume W-85 plots, again resulted from treatment with EP-162. Nematocidal efficacy of EP-161 was only a little less. Okra and cucumber plants were most vigorous on plots treated with EP-162. Growth of snap beans was about the same on all plots.★★

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PEST ROUNDUP

(From Page 55)

From southwestern Minnesota, where the growers were showing concern. Heavy rains, disease, and parasites reduced populations of the insect on clover and alfalfa in the southern half of Illinois. In the northern half of the State, numbers ran as high as 5,000 per sweep, with severe damage to red clover. Some treatments were applied. Populations were on the decline in Iowa, but increasing in Wisconsin. Light counts were recorded in Delaware and Rhode Island.

The spotted alfalfa aphid has been light this year. Populations have been generally light in Arkansas, Oklahoma, Texas, and Nevada. Occasional heavy populations were reported from New Mexico, while in Nebraska counts doubled previous reports.

Among the fruit insects, the red-banded leaf roller was rather

prominent. Large numbers of the adults were trapped at Claverack, New York, early in May. Adults were much more abundant than in 1960, but counts were about one-half those of 1959. Activity in other New York counties indicated that the insect might be on the increase after the start of the decline in 1958. In Missouri, the insect appeared to be more numerous than for comparable periods during the past several years. Red-banded leaf roller adults were numerous in a few New Jersey apple blocks. Eggs were hatching in Massachusetts but hatching had not begun in Vermont by the last week in May. A very heavy hatch occurred in Mitchell, Indiana, area orchards but controls on apples were very effective.

Codling moth development generally was slow. Very few adults were emerging in New Jersey, and no adults had emerged in Ohio by May 26, which was a record late date. There was no hatch by May 24 in the Carbondale, Illinois, area. In Mesa County, Colorado, emergence was high, with counts of 50 to 80 per 5 traps. Adults were collected in Davis County, Utah, the night of May 22 and the first eggs were found May 19, on pear trees in Jackson County, Oregon.

Flea beetles were perhaps the most active truck crop insects in May. In localized areas of New York, the insects were heavy on tomato and cabbage. Damage continued to potatoes in most areas of New Jersey. Heavy activity was reported on various vegetables in Allegheny County, Pennsylvania, and on untreated potato and tomato plantings in all sections of Maryland. In Weber County, Utah, potato foliage was being marked and some tomato plantings were damaged. Radishes and turnips were being damaged throughout the State.

The face fly again was becoming active in several states. By late May, counts were down in Vermont due to cooler weather, but increased annoyance was noted in

New York with counts per animal ranging from 4 to 60. The fly was common on cattle in the southern two-thirds of Ohio with counts of 10 to 20 per head. In Illinois, counts ranged from 0 to 40 per animal in the northern half of the State. Highest numbers were found on bright sunny days with temperatures at 67 degrees F. Activity also was reported from Iowa, Missouri, Michigan, Wisconsin, Illinois, Pennsylvania, and Maryland.

Screw-worms have been a problem in central and southern Texas. Dry weather has helped to keep the number of cases down, but scattered showers during late May were expected to bring about an increase.★★

BEST FERTILIZERS

(From Page 28)

and ag chemicals have been added to the sales team to give assistance to dealer salesmen.

Deciding that they must establish a more basic position in the manufacture of fertilizer materials, the company moved manufacturing operations from Oakland to Lathrop in 1952. A wet process phosphoric acid plant was built, and associated with it, an ammonium phosphate-sulfate pelleted fertilizer manufacturing operation. Best then began to manufacture its first pelleted "ammo-phos" which was called "Berry's 'Best'" named after the president of the company. This was an 11-8-4 grade containing not only nitrogen, phosphorus and potash, but also calcium and sulfur, as the five basic plant foods needed in California. Since that time, Berry's Best has become a favorite of vegetable crop growers, as well as the home gardener. In addition to Berry's Best, the company now formulates twelve different grades of complex ammonium phosphate-sulfate pelleted materials, and custom formulates another dozen to fit specific needs.

With an increase in the use of sulfuric acid, Best built a contact process sulfuric acid plant in 1956 with a capacity of 200 tons a day.

Last season, with the tremendous increase in the requirements for sulfuric acid, it was necessary to double the plant production capacity to over 400 tons daily. This acid is used, not only for manufacture of phosphoric acid and pelleted ammonium phosphate sulfate fertilizers, but also for the manufacture of ammonium sulfate. In addition, virgin sulfuric acid and oleum are sold for industrial use.

Due to a steady rise in the requirements for anhydrous ammonia and the products manufactured from it, Best organized its associate - The California Ammonia Co. which adjoins its other Lathrop operations. This plant, built to produce 150 tons a day of NH_3 , went on stream in January of 1959. About one-half of the 50,000 tons of ammonia produced annually is consumed in ammonium sulfate and ammonium phosphate pellets such as 16-20-20, 12-12-12, 19-9-0, 15-8-4, 6-20-20 and the like. The balance is marketed as anhydrous ammonia, aqua ammonia and liquid mixed fertilizers.

An interesting product that Best markets is phosphated gypsum which is a secondary product from the manufacture of wet process acid. The company sells some 30-40 thousand tons a year of gypsum as a soil conditioner. It is a very finely divided calcium sulfate product which contains about one percent of P_2O_5 . In the California Central Valley, this product has done an excellent job of improving soil structure and furnishing nutrients for plants.

W. L. Garman says: "Our fertilizer sales in general have paralleled those of the industry in that

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liquid fertilizers have been growing at a more rapid rate than dry fertilizers. Sales of all fertilizer materials have been increasing at a rate of 5 to 10% a year since the war. It is interesting to note that there is an apparent trend back to more dry materials. The latest statistics from the Department of Agriculture show that use of ammonium sulfate increased over 9% during the past year. Superphosphate also showed better than a 16% increase. It would be anticipated that under more intensive land use, more completely balanced fertilizer plant foods will be required in the future. And, whereas previous to World War II, the state was basically a nitrogen consumer, today it is getting to be a complex fertilizer user of not only nitrogen, but also phosphorus, potash, calcium and sulfur, and in some cases, minor elements such as zinc, iron, boron and molybdenum."

The standard emblem for Best is the familiar red and white shield, used for many years in California.

The mottoes, "You Get Results with Best Fertilizers," and "You Get Results with Best Chemicals," are slogans of which the people at Best are justly proud. A major part of Best's advertising is through roadside signs which are well known land marks throughout the state.★★

PESTICIDE INJURY

(From Page 32)

the report states, if similar epidemics are to be avoided.

"The use of pesticides and other agricultural chemicals presents serious hazards to workers in California," the report continues. "If the incidence of illness from these chemicals is to decrease, much serious effort must be made to educate farmers and other workers in the safe use of these materials, and much research remains to be done for more complete understanding of the chemicals."★★



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CLAY

A 1960 test at the University of Wisconsin, against the northern corn rootworm, showed 3.5% corn lodging where 1/2-pound per acre of Heptachlor was used as a row treatment (involving 10% Heptachlor on 24/48 CREEK-O-NITE granules.) Untreated corn had 96.6% plant lodging in this experiment!

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TALE ENDS

A DELEGATION from Communist Roumania was scheduled to arrive in United States June 20 with the ostensible purpose of studying American agricultural methods. Aside from being greeted by Roswell Garst, who fawned all over Kruschchev on the occasion of the dictator's visit to the U. S. in '59, the new communist guests. It is reported, will visit fertilizer factories in Illinois and Michigan, and be conducted through the USDA's research center in Beltsville. Then, we presume, after they learn some of our secrets of how to raise bumper crops with a minimum number of farm workers, the millions of their farm population that will be freed from their jobs can be mobilized

into divisions to attack us. Maybe our thinking is a little old fashioned in this day when the lamb is supposed to lie down with the lion for a little lunch of lamb stew, but our guiding philosophy would be "tell 'em nuthin."

AC

Observers agree that a lot of the land that went into the government's Emergency Feed Grain Program this season was land that would not have been planted to a crop in any case. Following a wet spring which made it impossible to get into the fields, it was an easy decision for the farmers concerned to make in March or April to "retire" from production these acres that they couldn't cultivate anyhow. It would seem

only logical to ask the farmer to make his decision on retiring acreage by December or January at the latest, — but when did any government agency ever bother with logic?

AC

Secretary of Agriculture Orville Freeman made a strong appeal at the recent NPFI convention to keep the "family farm" strong and prosperous, maintaining that this type of farm is actually a highly efficient operation which only needs a fair shake of the legislative dice to hold its own with powerful labor and industry. Politically, the secretary's argument has an understandably strong appeal, but economically we feel that he may be trying to resuscitate a dead horse. Far too many of the "family farms" he was talking about are of the submarginal variety, cannot compete on a basis of efficiency with the big mechanized corporate-type farms that have grown up within the past ten or fifteen years, and can yield a profit to their owners only during the abnormal period of war time or with the artificial aid of a continuing government subsidy.

AC

An unusually severe grasshopper and cutworm outbreak in Saskatchewan this season has exhausted the entire supply of pesticides in stock in the province. The extremely warm and dry weather is blamed for a speed-up in hatching, which necessitated a heavy chemical demand on short notice. The Saskatchewan Department of Agriculture, in anticipation of the grasshopper outbreaks, had 100,000 gallons of pesticide in stock at the start of the season but half of this had to be used for cutworm control.

AC

An interesting institutional advertising campaign is being carried on this season by the Nebraska Agricultural Aviation Association, which is placing advertisements in the Nebraska Farmer to advise farmers that aerial applicators help the farmer to produce "higher yielding crops by better farming methods." Included in the ads is a complete listing of the names and addresses of all aerial applicators in Nebraska who are members of the association.

AC

From time to time in the United States, various schemes have been proposed whereby a manufacturer can have his product listed as "approved" by various institutes and research laboratories upon the payment of a certain fee. In England, they have gone a step farther and the government now has an Agricultural Chemicals Approval Scheme that is intended to guide users of agricultural chemicals when choosing between the "hosts of products which are available." The first complete list of products (more than 400 pesticides) was published earlier this year and there have been at least four additional lists. Purchasers of agricultural chemicals in England have been advised to buy only those products which bear a distinctive "A" on the label.

A TYPICAL AGRICULTURAL CHEMICALS SUBSCRIBER TELLS

Why He Reads Agricultural Chemicals



J. G. BRUNTON
Kolker Chemical Corp.
Newark, N. J.

AGRICULTURAL CHEMICALS provides us with a complete coverage of all facets of the manufacture and use of chemicals in agriculture, and does so in an informative and highly-readable manner. The monthly columns prepared by regular contributors to the magazine can be counted on to offer much information of interest to us, as do the feature articles that are regularly prepared by outstanding authorities on the many topics covered by AGRICULTURAL CHEMICALS.

Kolker Chemical Corp., Newark, New Jersey, offers a line of methyl bromide fumigants for eliminating infestations of grain, tobacco, plant beds, seeds, dried fruits, cereals, nuts, and a wide variety of other products. Among the products offered are a benzyl benzoate insect repellent; methyl bromide 100%; methyl bromide with 2% chloropicrin; and a methyl bromide 98% tobacco plant bed fumigant. Jack Brunton is vice president of the corporation.

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For pre-emergence or early post-planting weed control in corn. One application controls annual broadleaf weeds and grasses all season. Non-injurious to corn, safe to handle, non-irritating. At higher dosage rates, used as a non-selective herbicide for industry.

SIMAZINE

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For pre-emergence weed control in corn and in nurseries. One application provides season long control of broadleaf weeds and grasses. Non-injurious to corn, safe to handle, non-irritating. At higher dosage rates, used for non-selective weed control for industry.

DIAZINON

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Highly effective, versatile organic phosphate insecticide. For dependable multiple insect control on most fruit and vegetable crops; residual fly control in dairy barns, farm buildings and food processing plants. Extensively used by PCO industry for control of roaches and other insects.

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Multi-purpose insecticide with residual action against insects attacking forage crops and stored grain; and for control of many insect species on fruit and vegetable crops. Direct application to livestock controls horn flies, cattle lice and ticks.

CHLOROBENZILATE

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Safe, effective miticide for use on deciduous and citrus fruit, ornamentals and nursery stock. Long residual action.

SEQUESTRENE

Metal Chelates

For correction of minor element deficiencies in ornamentals, fruit trees, vegetables and turf. Compatible with most commonly used insecticides, fungicides and fertilizers.

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NEW BULLETIN FOR 1961

From National Canners Association

describes

importance

of ...



DROSOPHILA CONTROL

The following excerpts are taken from this bulletin.

NATIONAL CANNERS ASSOCIATION
1133 - 20TH STREET, NORTHWEST
WASHINGTON, D. C.

NOTICE

"The Food and Drug Administration has made extensive seizures of tomatoes and tomato products due to *Drosophila* egg and maggot contamination."
..."We strongly urge the cooperation of all canners of tomatoes and tomato products to initiate a complete program of *Drosophila* control."

Use of Pyrethrum Dust

"Extensive experiments and industry experience have revealed that pyrethrum dust containing 0.1% stabilized pyrethrins plus 1.0% piperonyl butoxide applied to tomato fruit will repel *Drosophila* flies and largely prevent egg deposition for 10 to 20 hours."

"Tomato canners are urged to discuss the above pyrethrum dust requirements with their supplier and obtain adequate certification that the dust purchased meets these requirements, namely:

(a) "That the dust contains a minimum of 0.1% stabilized pyrethrins plus 1.0% of piperonyl butoxide."

(c) "That the pyrethrum dust has been prepared in thoroughly clean equipment."



Copies of "Drosophila Control," from which these excerpts were taken, are available free from Fairfield Chemicals.

Pyrethrum dust bases, containing piperonyl butoxide and pyrethrins, are available to insecticide formulators and processors nationally through the nationwide field offices and sales representatives of Fairfield Chemicals, Food Machinery and Chemical Corporation.

*Reg. U.S. Pat. Off. F. M. C.



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